

# Installing and configuring Microsoft Lync Server 2013

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# Version History

Blockpoint/Version	Date	Contributor	Revision Activity Description
1.0/v.00	01/25/2014	Peter Dorner	Initial Version – AD preparation, SQL mirror configuration
1.0/v.01	01/27/2014	Peter Dorner	Added Lync File Store config, DNS Settings
1.0/v.02	01/28/2014	Peter Dorner	Added Topology builder, FE Server installation
1.0/v.03	01/29/2014	Peter Dorner	Added 2nf FE installation, backup pool
1.0/v.04	01/30/2014	Peter Dorner	Added Reporting, PBX config and updating Lync server



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## 1. Introduction

The following document is a build out for a hypothetical company called PS-United. The company based in Miami, FL with one single Active Directory Forest along with one subnet and a recently built Exchange 2013. The build out is providing simple HA but no site resiliency. The company recently purchased a PBX which has to be integrated to the new Lync environment in order to use the Lync client for making phone calls.

# 2. Lync components

### Lync Front End Server Pool

The Front End pool provides the connection point to the clients. It's responsible for registering users, clients and routing them and because of this routing all connections from the same user must go to the same front end server. One Lync server pool with 2 Front End server will be configured to provide basic failover. The pool will provide the following functionality to the clients:

- User authentication
- Address book service
- Instant Messaging and presence information
- Audio and video conferencing
- Mediation server to provide connection to the existing PBX phone system

# Lync File Share Server

The Lync File Share is used to generate and publish the Lync address book and store IM attachments. In this case no HA nor disaster recovery will be implemented, however if needed deploying a DFS infrastructure can provide both feature using DFS replication between the member servers.

### **Backend Database Servers**

Lync has a requirement for a SQL server to store different databases associated with different Lync services. Lync2013 supports database mirroring for HA. Two servers with the Lync database mirror and a third SQL Witness server is used to provide the same data for both databases. In the event of a database server failure Lync will access to another server.

# **Monitoring**

With the monitoring role we can collect

Usage information, call detail and call error records



- Quality metrics
- Detailed listing of the Call Admission Control (CAC)
- Failures within Lync communication

### **Mediation role**

This role is used to connect Lync to the PSTN or PBX using SIP trunking.

### Lync Edge Server

The purpose of edge server pool is to provide the communication mechanism for instant messaging based communication to public IM providers. High availability is achieved with multiple hardware load balanced Edge servers. It has the following remote capability:

- Remote Access for external users
- Federation with other organizations
- Federation with Windows Live, Yahoo!, AOL, Skype and XMPP

### **Director**

The Director role is required for enhanced security; it provides a role to validate authentication requests within the DMZ for external users. In the event of a denial of service attack, the attack would end at the director role and no service interruption occur for internal user.

#### Persistent Chat

Persistent chat server enables users to join multiparty, topic based conversations. A separate Persistent chat Front End server runs the service and a Persistent Chat Back End server stores the chat history and chat informations. Maximum of four Persistent Chat servers can installed to provide HA.

# Survivable Branch Appliance

The Survivable Branch Appliance is special all-in-one hardware device providing Lync functionality. In the event of a WAN outage the appliance can provide local calling functionality but contact list and conference call would be unavailable.

# Load Balancing and High Availability

Load balancing can be provided in two ways. DNS and hardware load balancing. This document does not cover hardware load balancer setup. High Availability (HA) is provided within the pool with multiple FE server. In case of a server failure due to the DNS setup and the resilience within the pool users will be connected to the other available server.



# 3. DNS Name Resolution

Microsoft Lync has specific DNS requirements, in addition to the standard host A record requirements for individual servers and clusters, additional CNAME and SRV records are required for load balancing and the advertisement of Lync services to the end clients. The DNS configuration is listed later in this document.

# 4. Autodiscover

Clients use Autodiscover to find the Lync pool. No SRV record is used for Autodiscover. A DNS A record pointing to the Lync pool will be used.



# 5. Initial network configuration:

Server name	Role	IP	Windows Version
	Miami	<u> </u>	
LyncDC-MIA-01 DC, GC, DNS, Operations Master		192.168.2.11/24	Windows Server 2008 R2 Enterprise with SP1
LyncDC-MIA-01	cDC-MIA-01 DC, GC, DNS		Windows Server 2008 R2 Enterprise with SP1
LyncCAS-MIA-01 Exchange 2013 CAS		192.168.2.21/24	Windows Server 2008 R2 Enterprise with SP1
LyncMBX-MIA-01	yncMBX-MIA-01 Exchange 2013 Mailbox		Windows Server 2008 R2 Enterprise with SP1
LyncFE-MIA-01	Lync 2013 Enterprise FE server	192.168.2.41/24	Windows Server 2008 R2 Enterprise with SP1
LyncFE-MIA-02	Lync 2013 Enterprise FE server	192.168.2.42/24	Windows Server 2008 R2 Enterprise with SP1
LyncBE-MIA-01	Lync 2013 BE server – SQL 2012 Enterprise	192.168.2.51/24	Windows Server 2008 R2 Enterprise with SP1
LyncBE-MIA-02	Lync 2013 BE server – SQL 2012 Enterprise	192.168.2.52/24	Windows Server 2008 R2 Enterprise with SP1
LyncWN-MIA-01	Witness server for SQL and FileShare server for Lync – SQL 2012 Express	192.168.2.71/24	Windows Server 2008 R2 Enterprise with SP1
LyncCa-MIA-01	CA server	192.168.2.61/24	Windows Server 2008 R2 Enterprise with SP1
PBX	PBX System		Asterix PBX



Windows Server 2008 forest and domain functional level

Internal domain name: ps-united.com

External domain name: ps-united.com

Single Tier PKI Infrastructure

### External and Internal Exchange FQDNs

OWA for Miami Miami.ps-united.com

Autodiscover for Exchange autodiscover.ps-united.com

Internal Autodiscover for Lync lyncdiscoverinternal.ps-united.com

External Autodiscover for Lync lyncdiscover.ps-united.com

Lyncpool name: lyncpool.ps-united.com



# 6. Prerequsites

# Hyper-V based virtual machines

On the Domain Controllers (DNS servers) for proper DNS resolution you need to run the following commands otherwise the replication will failing between the sites using Hyper-V virtual switches

```
dnscmd /Config /EnableEDnsProbes 0
```

On all servers change the Network Card settings under Computer Management and disable the following:

IPv4 Large Send Offload

Checksum Offload

## Lync Server Prerequisites

- .NET 3.5 Framework
- .NET 4.5 Framework
- Microsoft Silverlight
- Windows Management Framework 3.0
- Windows Identity Foundation 3.0
- KB2646886 install after all IIS 7.5 components are installed <a href="http://support.microsoft.com/kb/2646886">http://support.microsoft.com/kb/2646886</a>
- Persistent chat
  - Microsoft Message Queuing

The following IIS modules are required for the FE and Director servers

- Static Content
- Default Document
- HTTP Errors
- ASP.NET
- .NET Extensibility,
- Internet Server API (ISAPI) Extensions
- ISAPI Filters
- HTTP Logging
- Logging Tools



- Tracing
- Client Certificate Mapping Authentication
- Windows Authentication
- Request Filtering
- Static Content Compression
- Dynamic Content Compression
- IIS Management Console
- IIS Management Scripts and Tools

### Use the following PowerShell command to install the required IIS modules:

Import-Module ServerManager

Add-WindowsFeature Web-Static-Content, Web-Default-Doc, WebHttp-Errors, Web-Asp-Net, Web-Net-Ext, Web-ISAPI-Ext, Web-ISAPIFilter, Web-Http-Logging, Web-Log-Libraries, Web-Http-Tracing,
Web-Windows-Auth, Web-Filtering, Web-Stat-Compression, Web-DynCompression, Web-Mgmt-Console, Web-Scripting-Tools, Web-BasicAuth, Web-Client-Auth -Restart

# Add the Remote System Administration Tools and the Desktop Experience Windows feature by running the following cmdlets:

```
Import-Module ServerManager
Add-WindowsFeature RSAT-ADDS, Desktop-Experience
```

#### Install the Windows Media Format Runtime

%systemroot%\system32\dism.exe /online /add-package
/packagepath:%windir%\servicing\Packages\Microsoft-WindowsMedia-Format-Package~31bf3856ad364e35~amd64~~6.1.7601.17514.mum
/ignorecheck

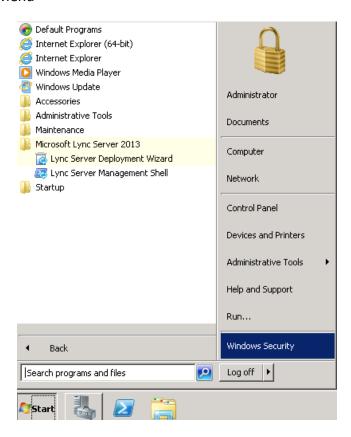


# 7. Preparing the schema, forest and the domain.

Before you can begin install Lync Server Management Shell by running the Setup.exe from the Lync DVD.



When it finished close the Lync Server Deployment Wizard and open Lync Server Management Shell from the Start Menu





Schema update will running against the holder of the schema master FSMO, the account you use need to be member of the Schema Admin group. You need the Active Directory Domain Service Tools are installed before you begin. Run the following cmdlet from the Lync Shell

Schema upgrade - Install-CsAdServerSchema

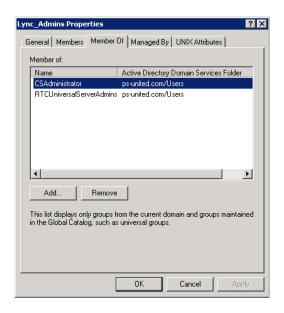
Forest prep - Enable-CsAdForest

Domain prep - Enable-CsAdDomain

You can prepare your domain using the GUI. To do this start the **Lync Server Deployment Wizard** from Start Menu and select the **Prepare Active Directory** option. The preparation steps are straight forward using the wizard.



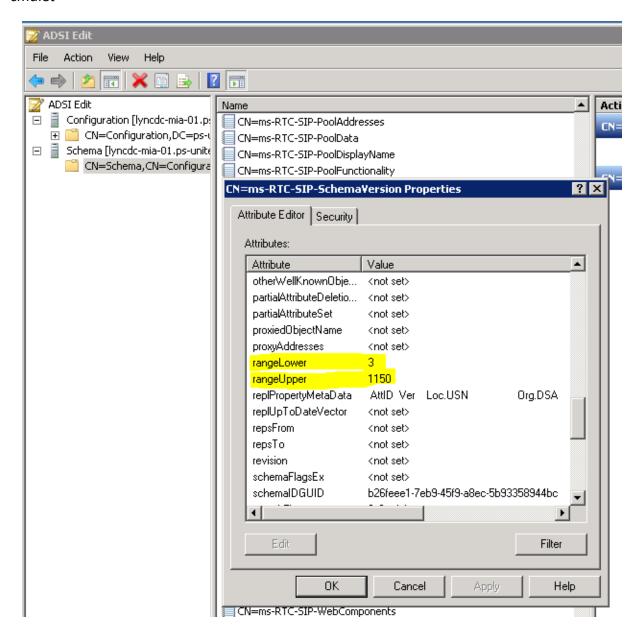
Add the Lync server administrators to the CSAdministrator, RTCUniversalServerAdmins and RTCUniversalUserAdmins group

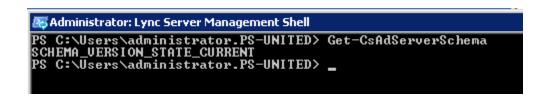




# Verifying the new forest, schema and domain version

To verify the schema update check the CN=ms-RTC-SIP-SchemaVersion where the rangeUpper value should be 1150 and the rangeLower 3 or run the Get-CsAdServerSchema cmdlet





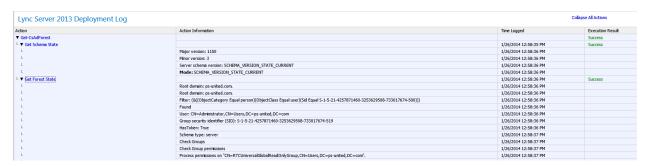


For forest preparation verification open Active Directory Users and Computers under the Users OU you should security groups starting with CS and RTC. The complete list of the new groups shown the following table

RTC Groups	CS Groups	
RTCComponentUniversalServices	CSAdministrator	
RTCHSUniversalServices	CSArchivingAdministrator	
RTCProxyUniversalServices	CSHelpDesk	
RTCSBAUniversalServices	CSLocationAdministrator	
RTCUniversalConfigReplicato	CsPersistentChatAdministrator	
RTCUniversal Global Read Only Group	CSResponseGroupAdministrator	
RTCUniversalGlobalWriteGroup	CSResponseGroupManager	
RTCUniversalReadOnlyAdmins	CSServerAdministrator	
RTCUniversalSBATechnicians	CSUserAdministrator	
RTCUniversalServerAdmins	CSViewOnlyAdministrator	
RTCUniversalServerReadOnlyGroup	CSVoiceAdministrator	
RTCUniversalUserAdmins		
RTCUniversalReadOnlyGroup		

Command-line verification run the <code>Get-CsAdServerSchema</code> cmdlet For more details of the forest preparation run the following

Get-CsAdForest -Report C:\ForestPrep.html





# Domain verification

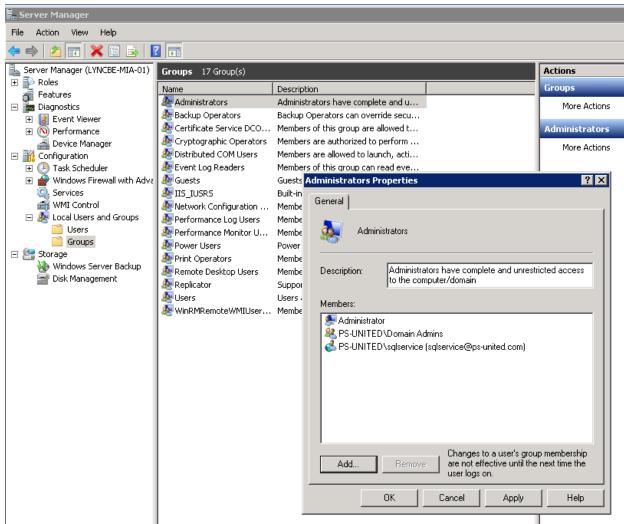
Get-CsAdDomain
Get-CsAdDomain -Report "C:\DomainPrepReport.html"



# 8. Configuring Back End server for High Availability

The Back End (BE) servers are database servers running Microsoft SQL and hosting the databases for archiving, monitoring and persistent chat. These databases can be collocated, however it's not recommended to share these with other non-Lync databases. The BE servers also serves a backup store for the pool's user and conference data. A single BE server is supported, however SQL failover, HA and/or disaster recover (DR) is recommended. In this case SQL mirroring will provide both the server and database HA. The BE servers don't have any Lync software installed.

Before the installation we create a SQL server service account, this account need to be part of the local administrator group on each SQL server with a strong password which never expires.

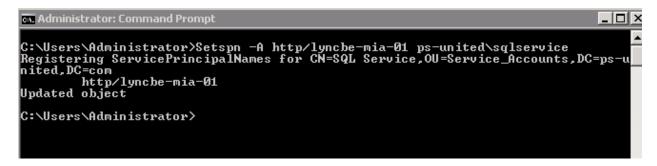


Next we need for delegation otherwise a logon prompt will pop-up every time you open the Reports web page (see step 14.). The Delegation tab is not visible by default on the ADUC and it

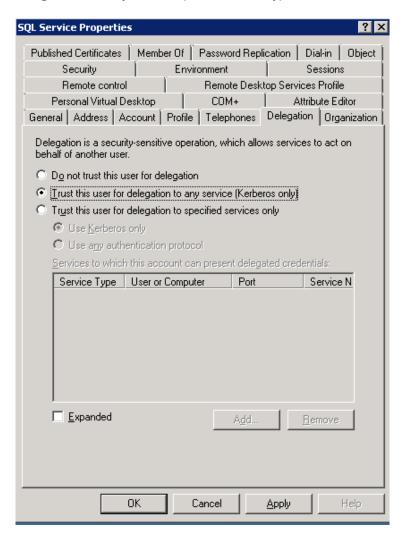


has a dependency. Called SPN so first setup the SPN for the service account. Run the following in a command prompt window

Setspn -A http/lyncbe-mia-01 ps-united\sqlservice



Now open the **Delegation** tab of the SQLService account from its Properties window and select **Trust this user for delegation to any service (Kerberos only)** 



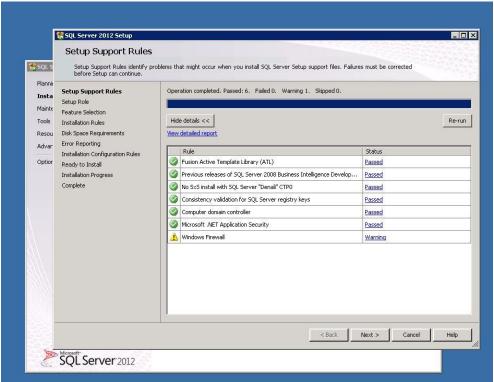
Install .NET 3.5 via the Add Features option from Server Manager.



# **Installing the SQL Servers**

Start the installation by selecting the New SQL Server stand-alone installation or add feature to an existing installation option



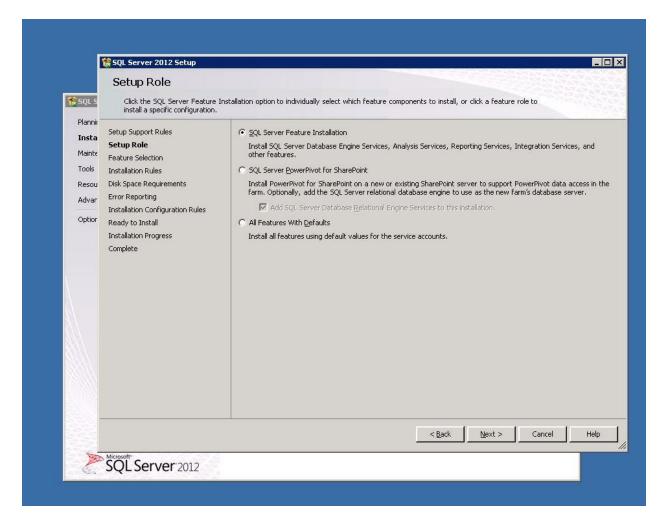




On the next page enter the product key and go Next

Read the License and select Next

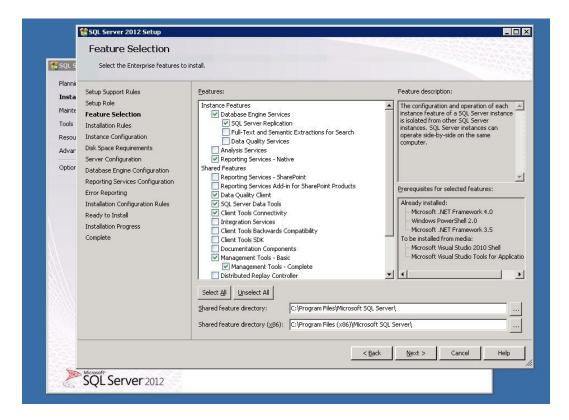
Select SQL Feature installation



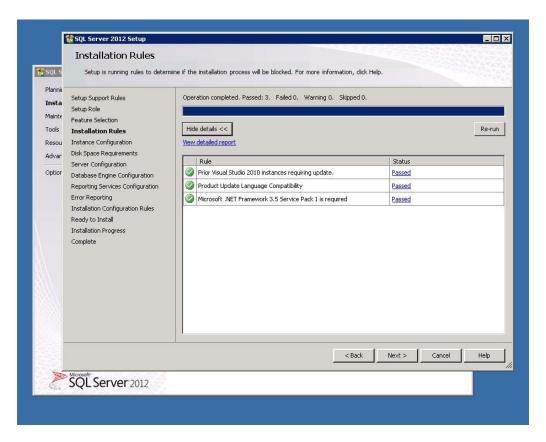
Select the following features on the features selection page

- Database Engine Services
  - SQL Server Replication
- Reporting Services Native
- Data Quality Client
- SQL Server Data Tools
- Client Tools Connectivity
- Management Tools Basic
  - Management Tools Complete



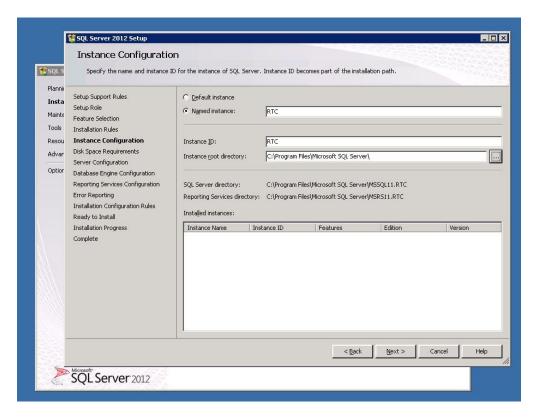


### Select Next

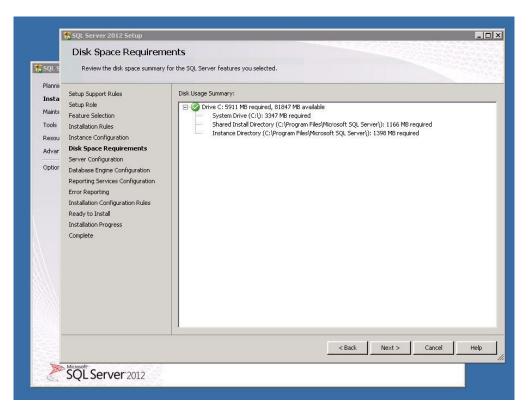




### Select Named Instance on the Instance Configuration page and call it RTC

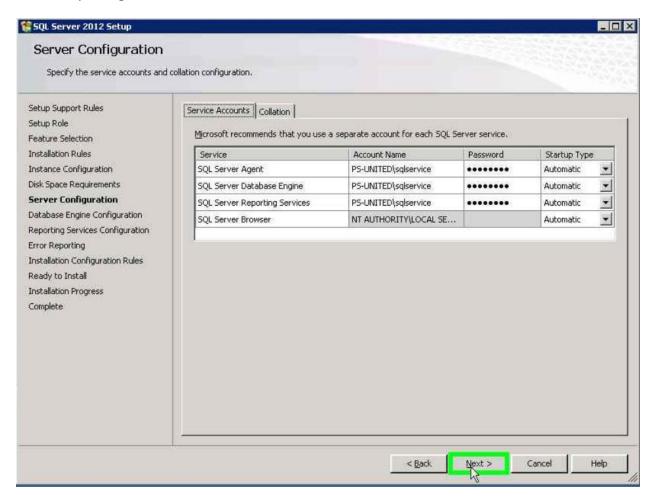


### On the summary page select Next



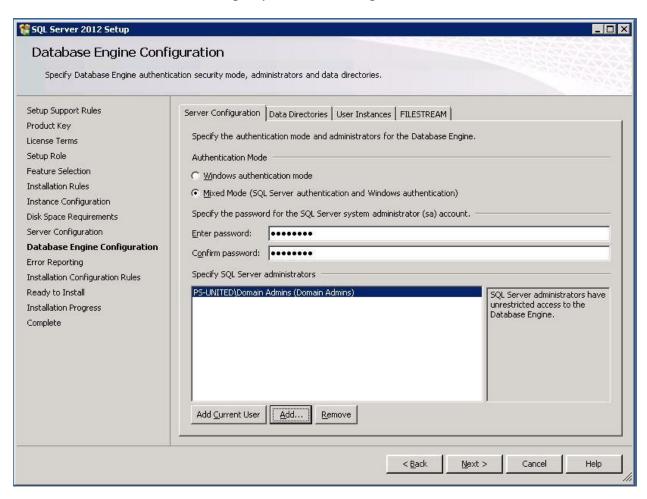


Set the domain account you created for SQL Server Agent, SQL Server Database Engine and SQL Server Reporting Services.

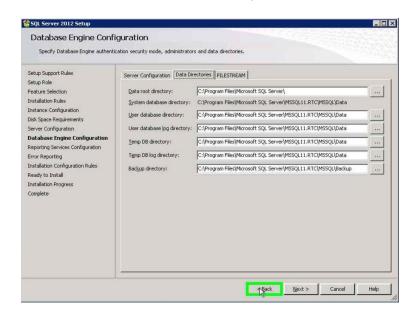




Select **Mixed Mode authentication** and set a password for the SA account. Also here you can add the administrators/administrator group who can manage the SQL Server

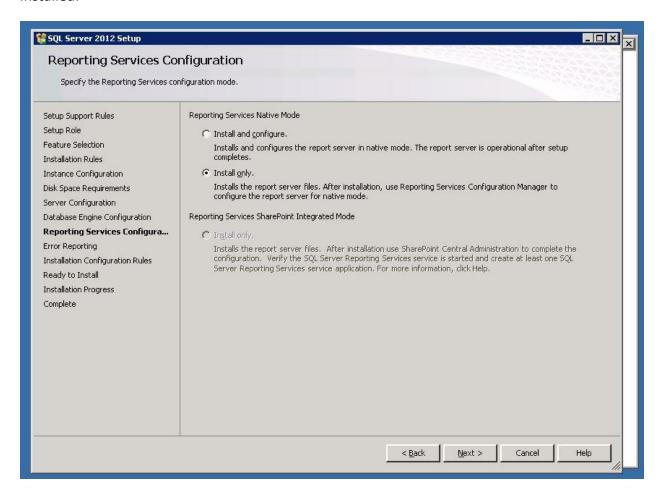


On the Data Directories tab set the Database locations, in this case lave the defaults.

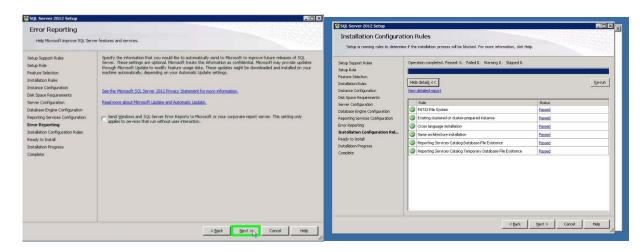




Select **Install Only** for the Reporting services we will configure it later when all SQL Servers are installed.

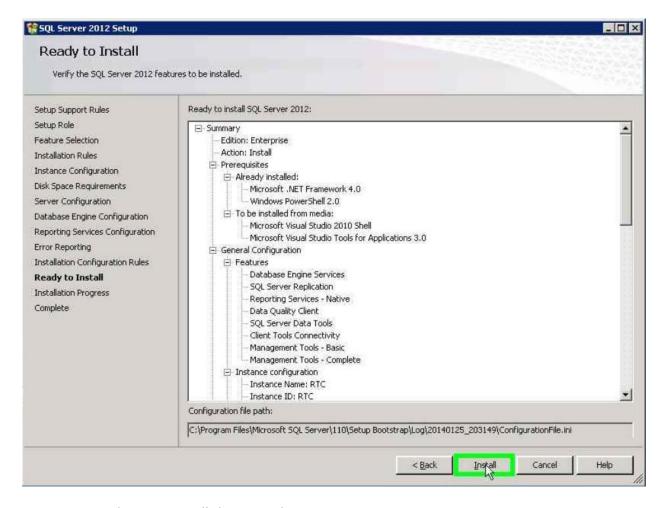


### Select Next and Next on the following two pages





Start the installation of the SQL Server



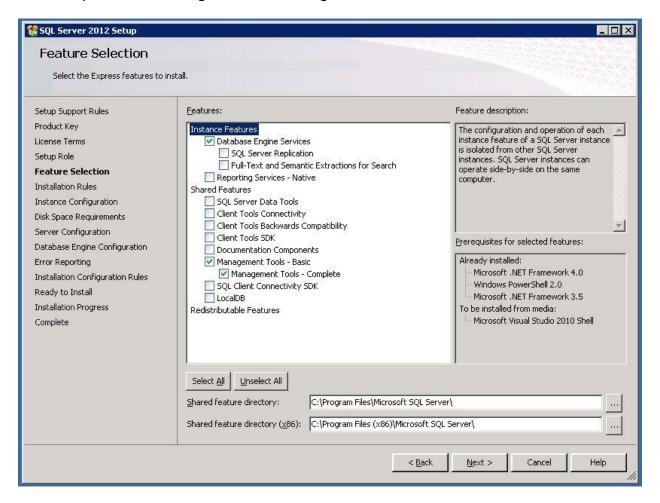
Repeat steps above to install the second SQL Server.



# Installing SQL Witness server

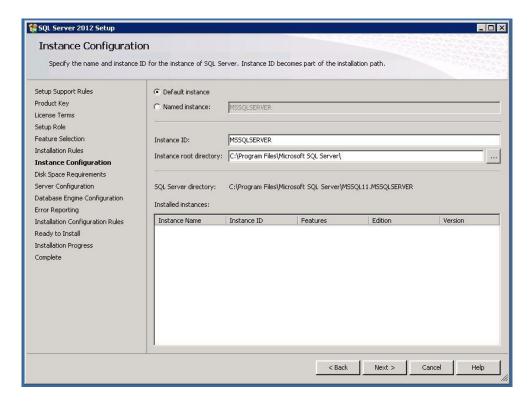
Install SQL Server as you did for the BE server I highlight only the differences or you can install SQL Express version as we only use this for witness and need only the database engine, the witness server will not use and of the features of a Standard/Enterprise version.

Install only the Database Engine and the Management Tools

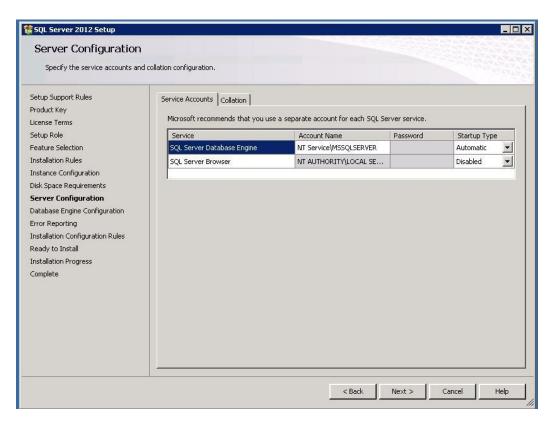




### User the Default Instance

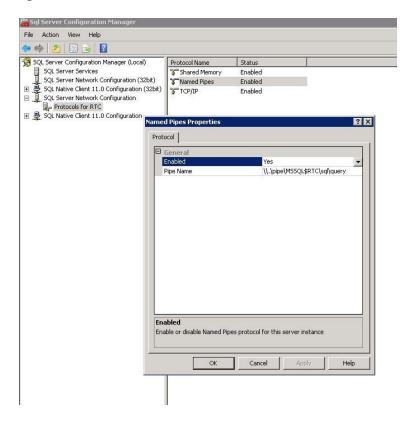


Use the **default accounts** and finish the installation.



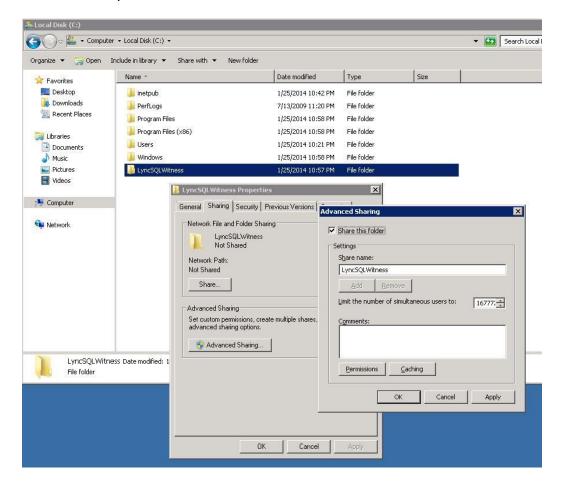


Make sure you opened the firewall and check that Named pipes are enabled under the SQL Server Configuration Manager

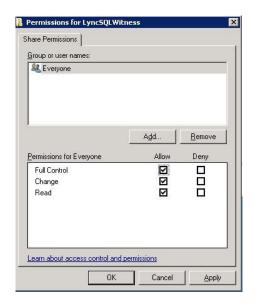




Create a share called LyncSQLWitness that SQL will use

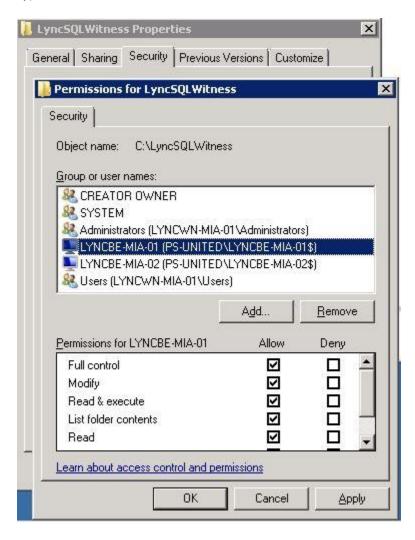


Give Everyone full control as a share permission we will restrict access through the NTFS permissions





Add the two BE SQL Server and the PS-United\SQLService user with Full Control on the NTFS Permission (Security) tab





# Configuring SQL for Lync 2013 deployment

### **Configuring Windows Firewall**

We need to configure the built-in Windows firewall so the SQL cluster can communicate with each other and with the witness. Run the following PowerShell commands on all SQL server including the witness or use the GUI to configure the firewall.

#### Server2008 R2

netsh advfirewall firewall add rule name="Allow inbound SQL
Server" dir=in action=allow protocol=TCP LocalPort=1433
RemoteIP=localsubnet

netsh advfirewall firewall add rule name="Allow inbound SQL Administrator Connection" dir=in action=allow protocol=UDP LocalPort=1434 RemoteIP=localsubnet

netsh advfirewall firewall add rule name="Allow inbound SQL Administrator Connection" dir=in action=allow protocol=TCP LocalPort=1434 RemoteIP=localsubnet

netsh advfirewall firewall add rule name="Allow inbound SQL
Server Broker" dir=in action=allow protocol=TCP LocalPort=4022
RemoteIP=localsubnet

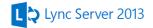
netsh advfirewall firewall add rule name="Allow inbound SQL
Server RPC" dir=in action=allow protocol=TCP LocalPort=135
RemoteIP=localsubnet

netsh advfirewall firewall add rule name="Allow inbound SQL Server Analysis" dir=in action=allow protocol=TCP LocalPort=2383 RemoteIP=localsubnet

netsh advfirewall firewall add rule name="Allow inbound SQL Server Browser" dir=in action=allow protocol=TCP LocalPort=2382 RemoteIP=localsubnet

netsh advfirewall firewall add rule name="Allow inbound SQL
Server Mirroring01" dir=in action=allow protocol=TCP
LocalPort=5022 RemoteIP=localsubnet

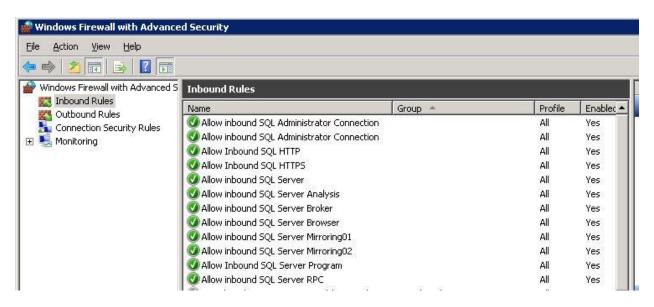
netsh advfirewall firewall add rule name="Allow inbound SQL Server Mirroring02" dir=in action=allow protocol=TCP LocalPort=7022 RemoteIP=localsubnet



netsh advfirewall firewall add rule name="Allow Inbound SQL HTTP" dir=in action=allow protocol=tcp localport=80 remoteip=192.168.2.0/24

netsh advfirewall firewall add rule name="Allow Inbound SQL HTTPS" dir=in action=allow protocol=tcp localport=443 remoteip=192.168.2.0/24

netsh advfirewall firewall add rule name="Allow Inbound SQL Server Program" dir=in action=allow program="C:\Program Files\Microsoft SQL Server\MSSQL11.RTC\MSSQL\Binn\sqlservr.exe" remoteip=localsubnet



### Enable the predefined rules listed below

- File and Printer Sharing (NB-Datagram-In)
- File and Printer Sharing (NB-Name-In)
- File and Printer Sharing (NB-Session-In)
- File and Printer Sharing (SMB-In)



- Remote Administration (NP-In)
- Remote Administration (RPC)
- Remote Administration (RPC-EPMAP)



- Windows Management Instrumentation (ASync-In)
- Windows Management Instrumentation (DCOM-In)
- Windows Management Instrumentation (WMI-In)

### **Windows Server 2012**

New-NetFirewallRule -DisplayName "Allow Inbound SQL Server" - Direction Inbound -Protocol TCP -LocalPort 1433 -RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Administrator Connection" -Direction Inbound -Protocol UDP - LocalPort 1434 -RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Administrator Connection" -Direction Inbound -Protocol TCP - LocalPort 1434 -RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Server Broker" -Direction Inbound -Protocol TCP -LocalPort 4022 - RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Server RPC" -Direction Inbound -Protocol TCP -LocalPort 135 -RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Server Analysis" -Direction Inbound -Protocol TCP -LocalPort 2383 - RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Server Browser" -Direction Inbound -Protocol TCP -LocalPort 2382 - RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Server Mirroring01" -Direction Inbound -Protocol TCP -LocalPort 5022 - RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow inbound SQL Server Mirroring02" -Direction Inbound -Protocol TCP -LocalPort 7022 - RemoteAddress LocalSubnet -Action Allow

New-NetFirewallRule -DisplayName "Allow Inbound SQL HTTP" - Direction Inbound -Protocol TCP -LocalPort 80 -RemoteAddress 192.168.2.0/24 -Action Allow



New-NetFirewallRule -DisplayName "Allow Inbound SQL HTTPS" - Direction Inbound -Protocol TCP -LocalPort 443 -RemoteAddress 192.168.2.0/24 -Action Allow

New-NetFirewallRule -DisplayName "Allow Inbound SQL Server Program" -Direction Inbound -Program "C:\ProgramFiles\Microsoft SQL Server\MSSQL\Binn\sqlservr.exe" -RemoteAddress LocalSubnet -Action Allow

### Enable the following pre-defined rules

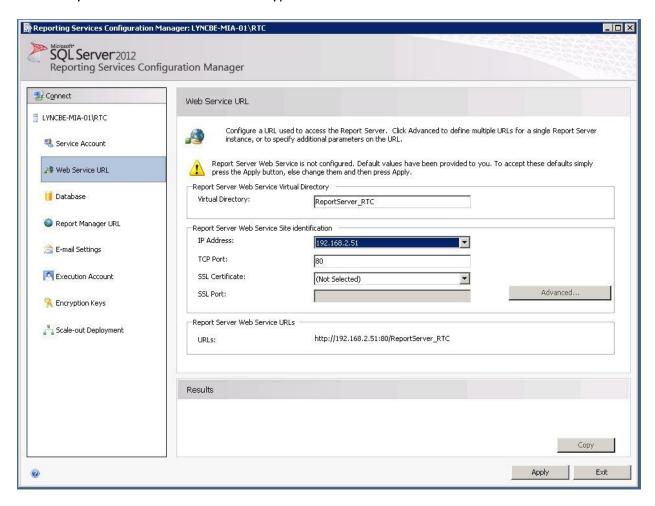
- File and Printer Sharing (NB-Datagram-In)
- File and Printer Sharing (NB-Name-In)
- File and Printer Sharing (NB-Session-In)
- File and Printer Sharing (SMB-In)
- Inbound Rule for Remote Shutdown (TCP-In)
- Inbound Rule for Remote Shutdown (RPC-EP-In)



### **Configuring the Reporting Services**

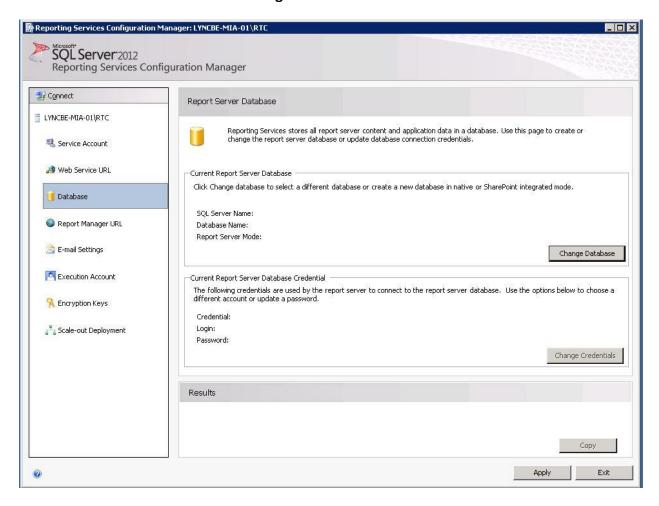
The following steps need to be done on both BE server.

Start the Reporting Services Configuration Manager from the Start Menu and select the **Web Service URL** option to configure the web access using IP 192.168.2.51. If a certificate is installed you can select to use and encrypt the communication



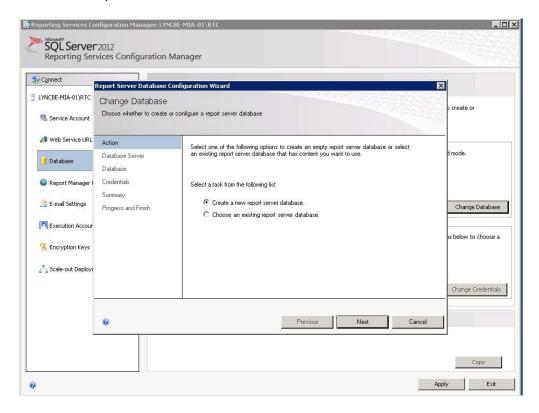


#### Go to the database tab and select Change Database

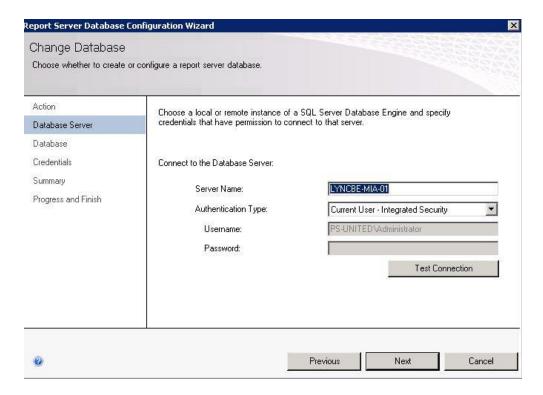




#### Select Create a new report server database



#### Leave the default and test connection

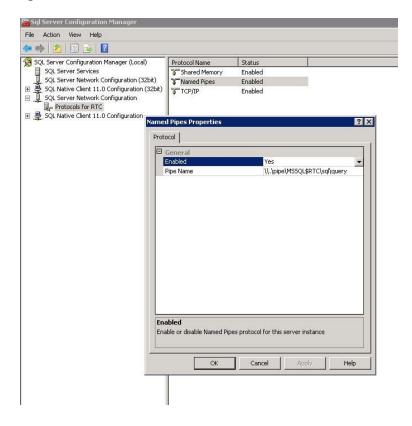




#### If it fails

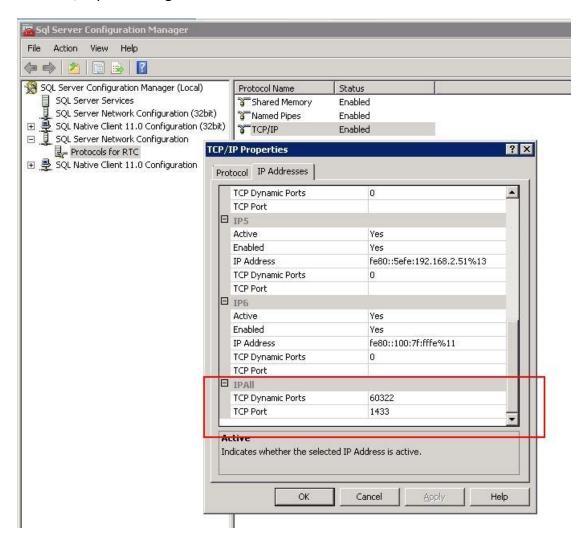


Make sure you opened the firewall and check that Named pipes are enabled under the SQL Server Configuration Manager



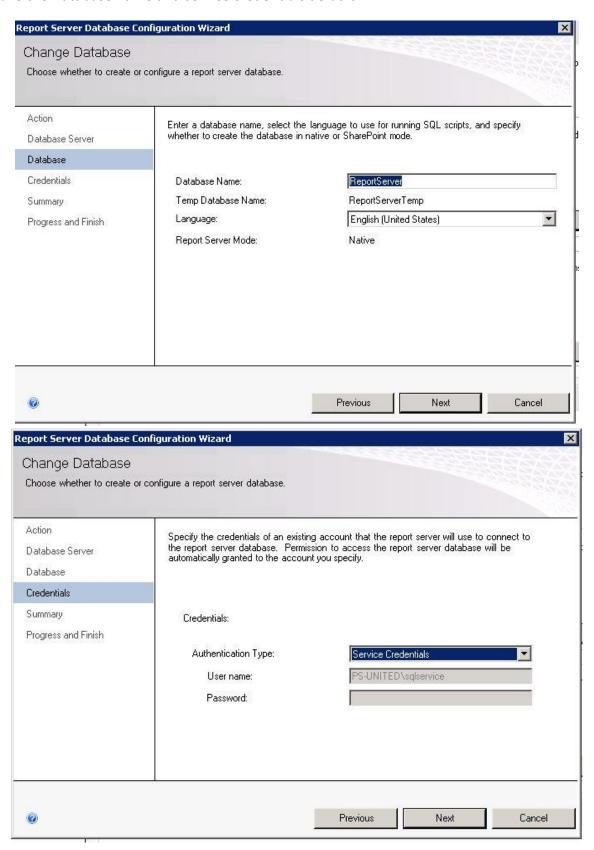


#### Check the TCP/IP port settings



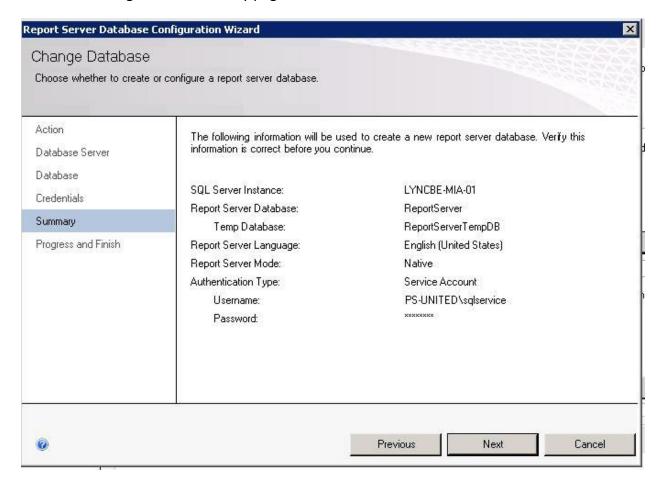


Leave the Database name and service credentials default



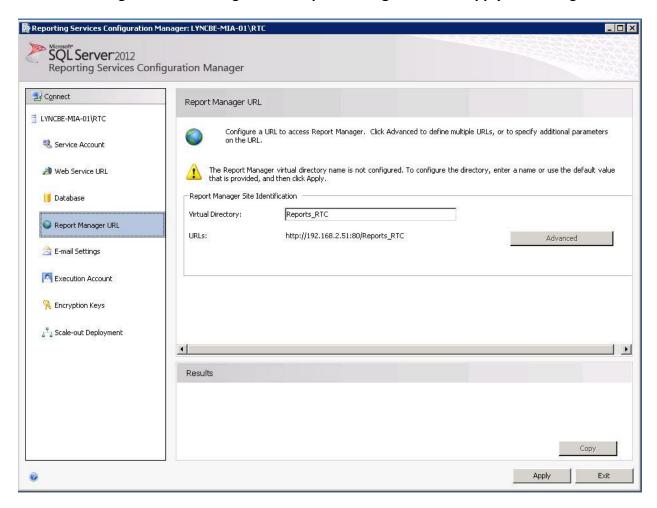


#### Check the settings on the summary page and select Next

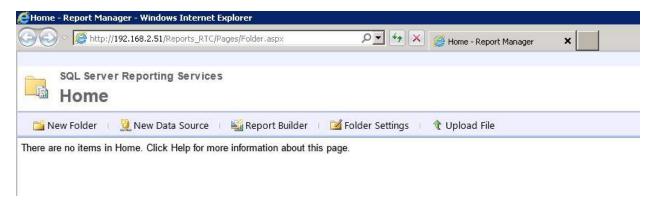




When the configuration finished go to the **Report Manager URL** and **Apply** the settings



Check the web services configuration by opening the link on the Report Manager URL page. The SQL Server Reporting Home Services webpage should pop-up.



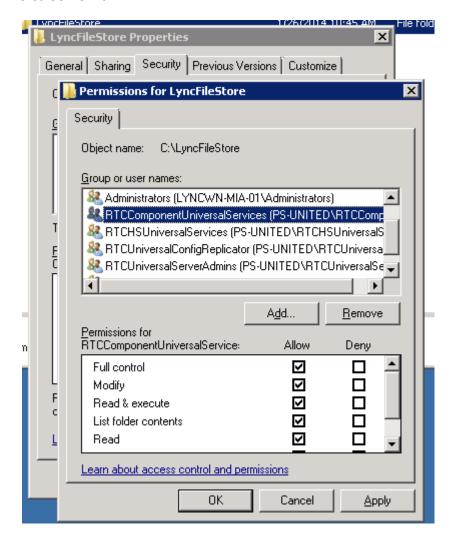


## 9. Configuring Lync File store

In this scenario we configure only a single file share, the configuration is the same on a DFS environment. The holder of this file share will be the SQL Witness server because there is no load in our test environment that would require a separate dedicated server.

Create a folder called LyncFileStore then share it. Give Full control for the following groups using the Security tab.

- RTCComponentUniversalService
- RTCHSUniversalServices
- RTCUniversalConfigReplicator
- RTCUniversalServerAdmin





# 10. Configure DNS

### **Setup Round Robin**

Got to LyncDC-MIA-01 and open DNS console. Open the DNS server properties and go to the Advanced tab. Select **Enable round robin**. Do the same on LyncDC-MIA-02 DNS as well.

### Creating SRV, A and CNAME records

Since the company internal domain and external are the same we need to configure Split DNS. Front End servers already should have an A record in DNS. Create the following SRV records on LyncDC-MIA-01.

				Port	
SRV Record	Protocol	Priority	Weight	number	Host
_sipinternaltls	_tcp	0	0	5061	lyncpool.ps-united.com
_sip	_tls	0	0	5061	lyncpool.ps-united.com
_ntp	_udp	0	0	123	LyncDC-MIA-01.ps-united.com

#### Create the A record

A Record	IP
LyncPool	192.168.2.41
LyncPool	192.168.2.42
Lyncdiscover	192.168.2.41
Lyncdiscover	192.168.2.42
Lyncdiscoverinternal	192.168.2.41
Lyncdiscoverinternal	192.168.2.42

#### Create the CNAME records

Cname Record	Target FQDN
Meet	lyncpool.ps-united.com
Dialin	lyncpool.ps-united.com
Admin	lyncpool.ps-united.com



# 11. Build out the Lync Topology

#### Pool settings:

Front End Pool:

Pool name: LyncPool.ps-united.com

Front End Server 1: LyncFE-MIA-01.ps-united.com
 Front End Server 2: LyncFE-MIA-02.ps-united.com

Back End Servers:

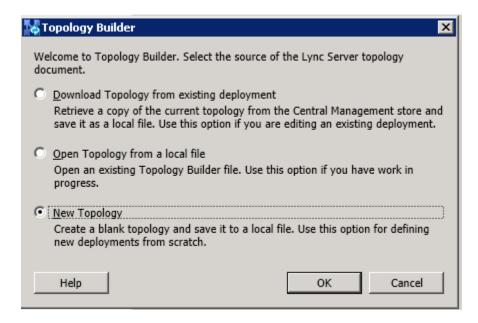
SQL Server 1: LyncBE-MIA-01.ps-united.com
 SQL Server 2: LyncBE-MIA-02.ps-united.com
 SQL Server 2: LyncWN-MIA-01.ps-united.com

Start the Lync Server Deployment Wizard and select Install Administrative Tools. When it's finished start the Lync Server Topology Builder from the Start Menu



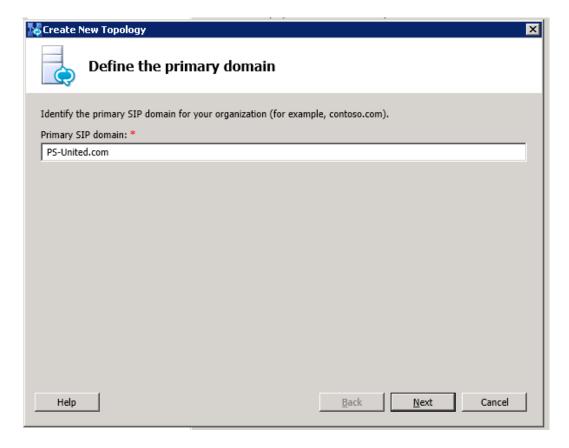


#### **Select New Topology**



Type a name for the topology file and save it.

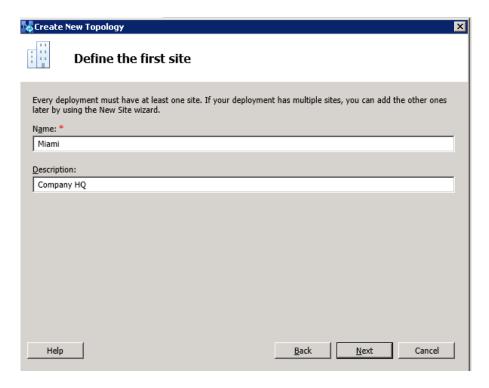
Type Ps-United.com as the Primary SIP domain



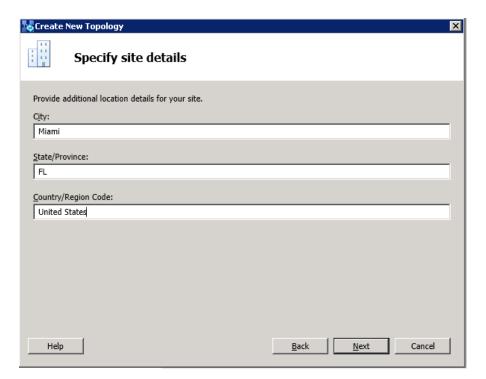


If you have more than one domain you want to use on the next screen you can add them. In our case just leave it empty and select Next

Enter Miami for the site name

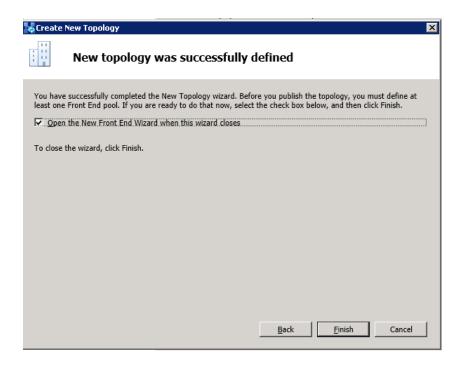


#### **Enter Site details**



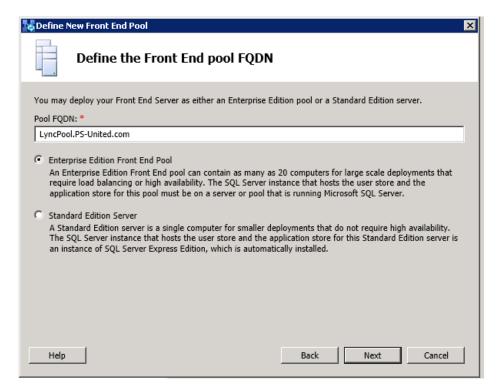


Make sure the Open the New Front End Wizard when this wizard closes is selected on the next screen and select Finish



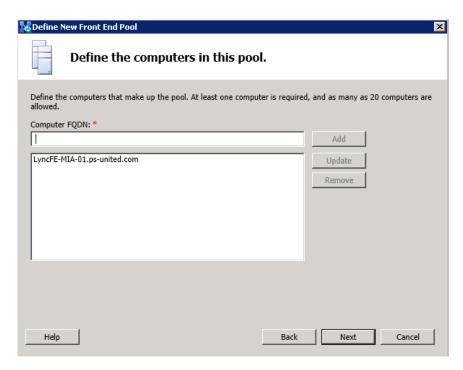
Select Next on the first page in the wizard

Type LyncPool.PS-United.com in the Pool FQDN field and select Enterprise Edition Front End Pool (if you select Standard Edition you won't be able to deploy a HA solution)

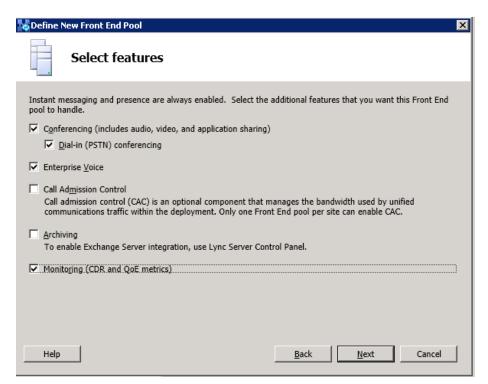




On the next page add the first FE server to the pool. You can add all of your but for now we add only the first in order to show how you can add additional server into the pool in a configured and working environment. Make sure you don't have typo in the server name, the wizard not validating the FQDN.

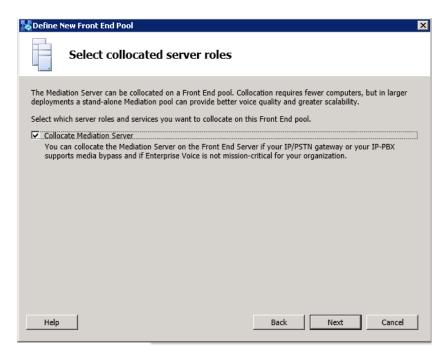


Select Conferencing, Dial-in and Monitoring features and select Next

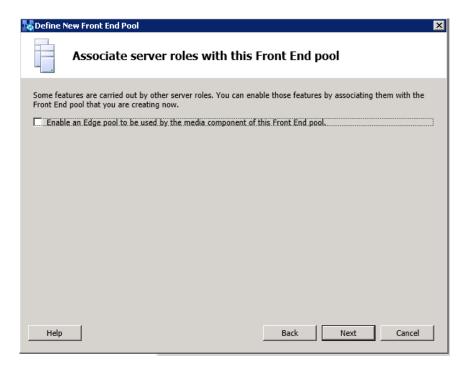




Since we are not deploying a separate Mediation server select the **Collocate Mediation Server** option and go **Next** 

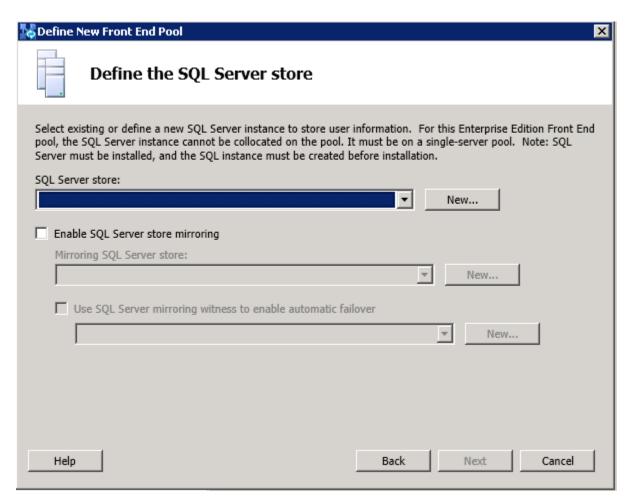


Don't enable Edge pool, at the moment no need for external access or integration with other IM solutions

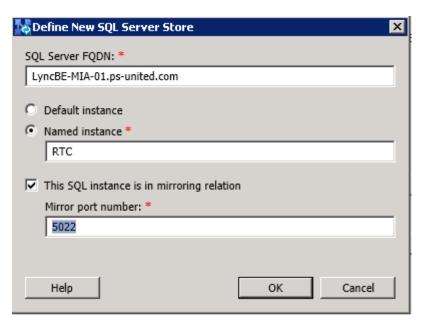


Select New to define the SQL Server store



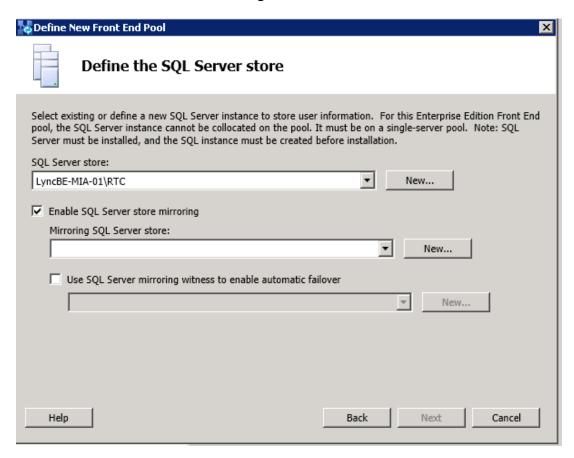


Type LyncBE-MIA-01 for the SQL Server FQDN then select Named Instance and type RTC. Make sure the This SQL instance is in mirroring relation is checked and the port is 5022





Check the Enable SQL Server store mirroring checkbox and select New...

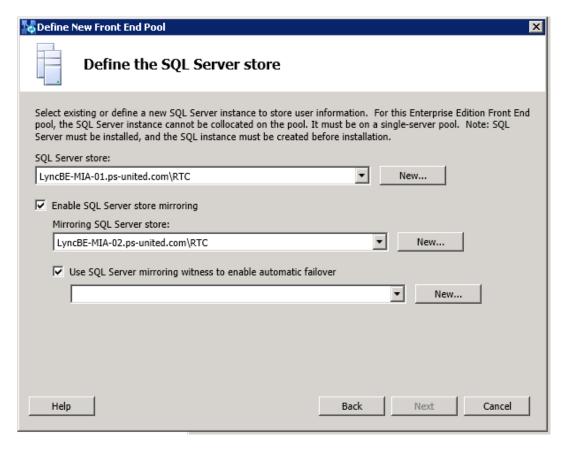


Type the second SQL Server details, FQDN is **LyncBE-MIA-02**, **Named Instance** is **RTC** and the **port** is **5022** 





Select Use SQL Server mirroring witness to enable automatic failover option and hit New...

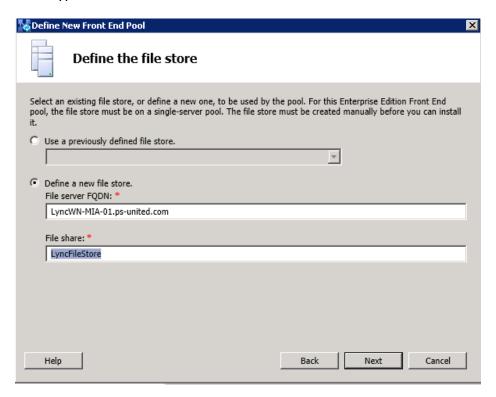


SQL Server FQDN is LyncWN-MIA-01.ps-united.com, use the Default Instance and the port should be 7022 then hit OK and select Next.

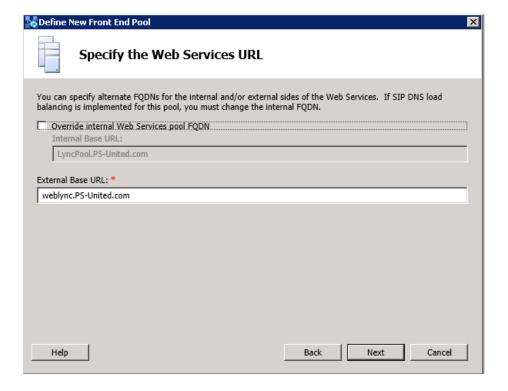




On the next screen we need to tell Lync where is the file share created above. Type LyncWN-MIA-01.ps-united.com for the File Server FQDN and LyncFileStore for the File Share. If DFS is used you need to type the DFS root for the Server FQDN.



Type the external name of the web services (even if it's not utilized at the moment)

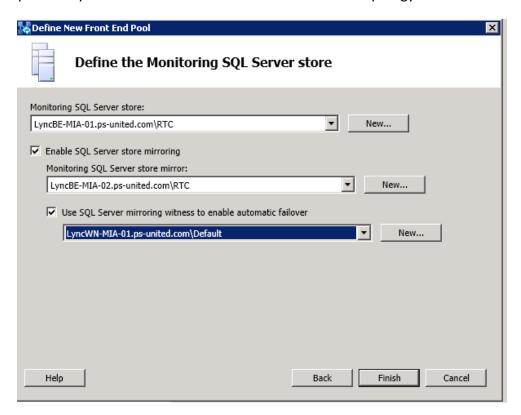




Uncheck the Associate pool with an Office Web Apps Server option

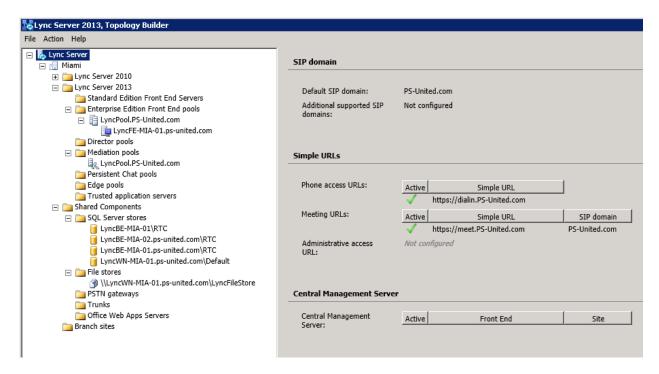


Select the previously created stores we created and Finish the topology wizard

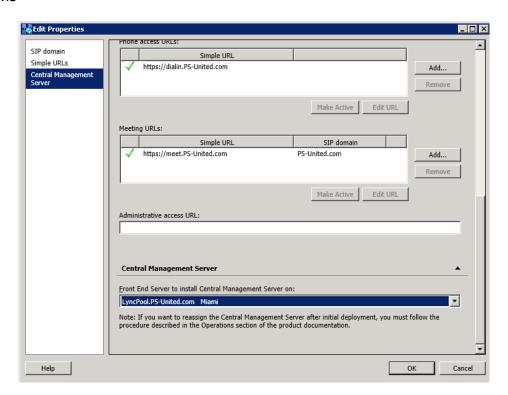




We finished the basic topology build out but a few additional steps is required before we can install the first FE server.



Go to the **Lync Server** at the top of the topology builder and open its **properties**. Go down to the bottom at the **SIP Domain** tab to select the Lync pool, we created with the topology builder, to be the CMS

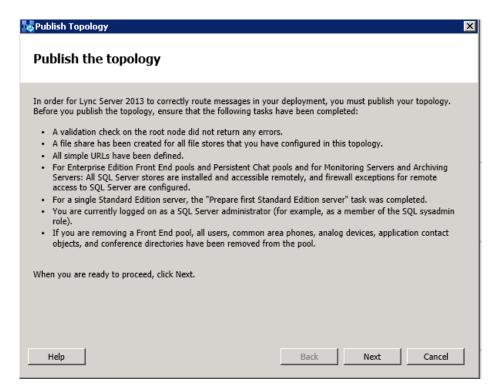




Browse through all the settings and make sure the FQDNs and database names are correct

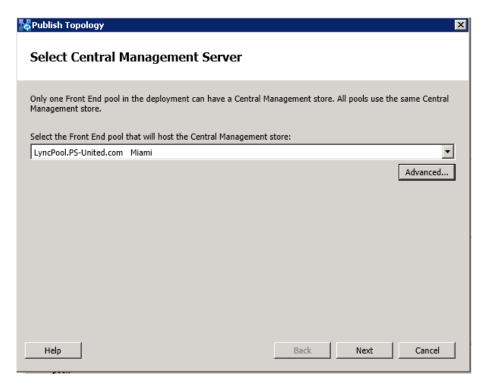


If everything is correct as a last step publish the topology. This will create the CMS and the databases along with the LyncFileStore configuration. Go to the **Miami site** do a right click select **Topology** then **Publish** 

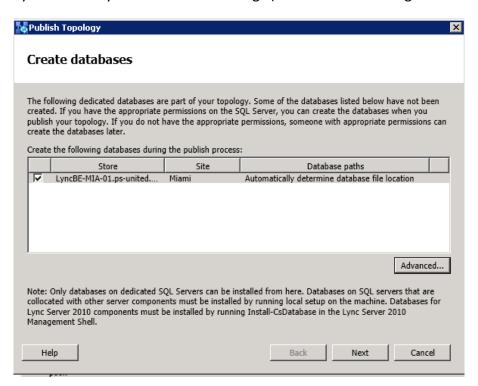




Select Next on the Select Central Management Server page (it should be the LyncPool)

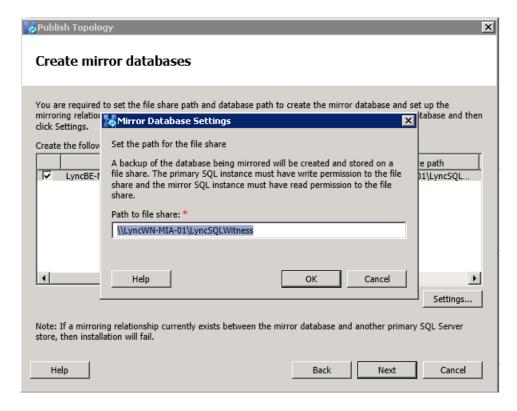


On the next page you can configure Lync where to put the database files. We need the default setting because we have only one drive in each SQL server, however if the database and logs files are separated you can tell Lync to use those settings (which created during the SQL setup)

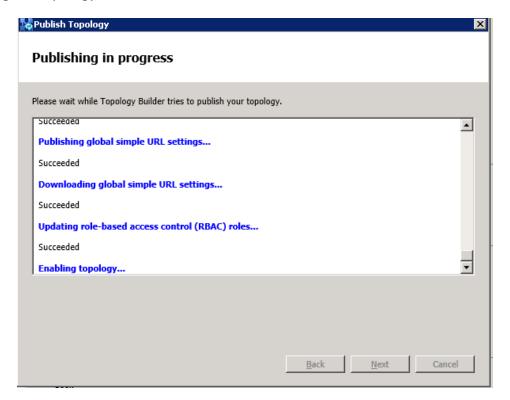




Select **Settings** on the Create mirror databases page to configure the path which in this case is **\\LyncWN-MIA-01\LyncSQLWitness** 



Publishing the topology will start





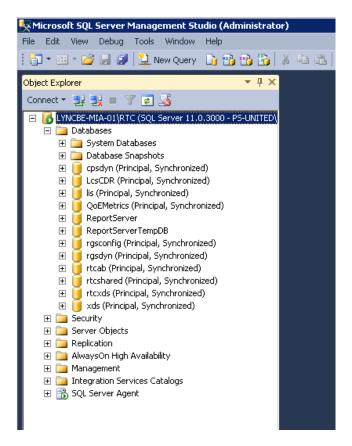
If the publishing fails check the logs. If the database installation failed make sure the two SQL and the SQLService service account has Full control NTFS permission on the LyncSQLWittness shared folder.

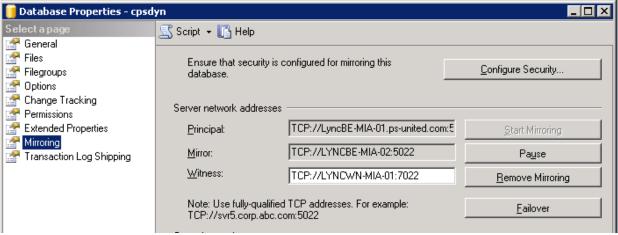
When the publishing is done we are almost there to install our first Lync server but before we doing that we need to check that database mirroring is working as it should be



### 12. Checking database mirroring

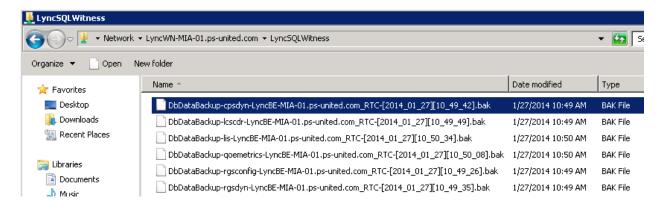
Go to the first back end server **LyncBE-MIA-01** and open the **SQL Server Management Studio** from the Start menu and connect to **LyncBE-MIA-01\RTC** database. Expand the Databases folder and you should see that the Lync databases are Synced. Open the properties of the **cpsdyn** database and go to the **Mirroring** tab where you can see the first and the second SQL server along with the witness.







You can check the replication by opening **the \\LyncWN-MIA-01.ps-united.com\LyncSQLWitness** file share. You should see the Lync databases.





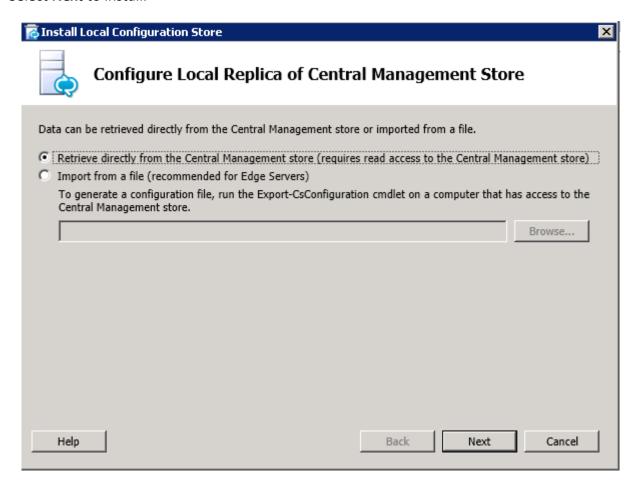
## 13. Installing the first front end server

After a successful topology build out we can install the first server. The wizard will use the CMS to identify what components need to be installed.

Start the Lync Server Deployment Wizard from the Start Menu and select Install or Update Lync Server System

### Step 1 - Install Local Configuration Store

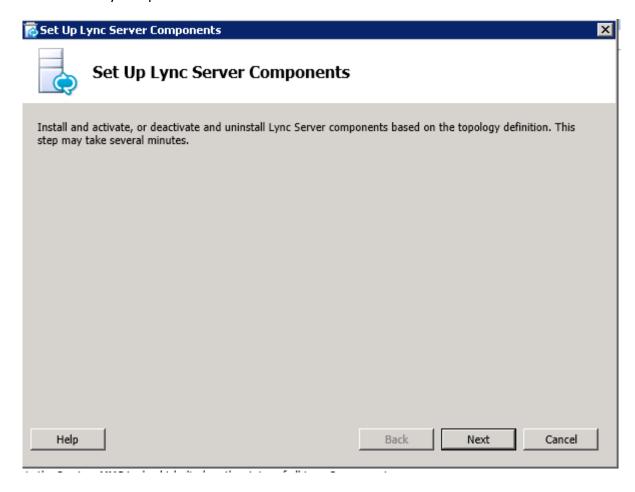
This step will install a local SQL Express to store the Lync configuration received from the CMS. Select **Next** to install.





# Step 2 - Setup Lync Server Components

Select **Next** on the first screen to begin the installation. The setup will read the configuration and install necessary components.





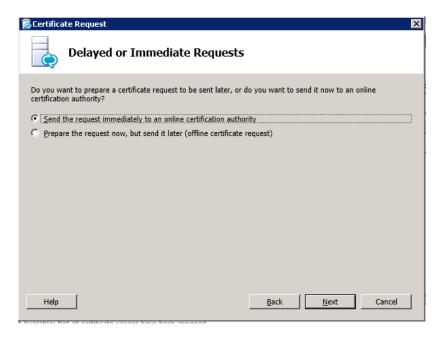
### Step 3 - Request, Install Certificates

Here we need to request two certificates for Lync. The first is for encrypt the traffic between the user and Lync meanwhile the second one (OAuth Token) is for server-to-server communications. Instead of sending the username, password the servers are using tokens for authentication and authorization. Lync 2013 (and Exchange 2013) have a built-in token server that will be utilized. The OAuth certificate is a global certificate meaning the same one will be used on all Lync server and it's replicated via the CMS.

Start with the default certificate select and hit Request

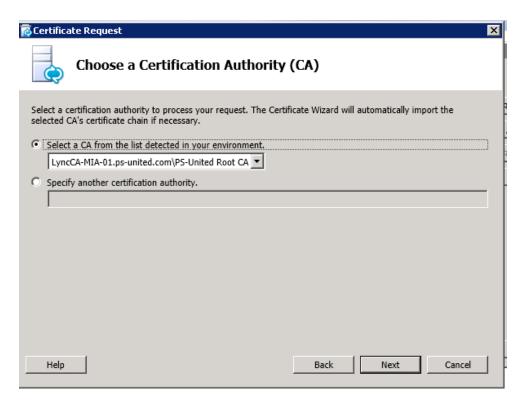


You can choose to create the request immediately or just prepare for an offline request. Select the first option

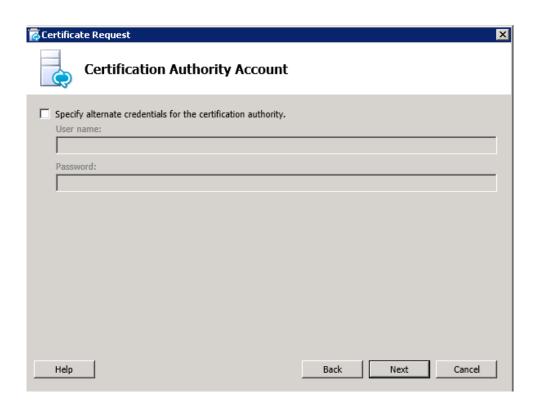




The wizard automatically select the CA server (LyncCA-MIA-01) if you need another one type the FQDN of that server then select **Next** 

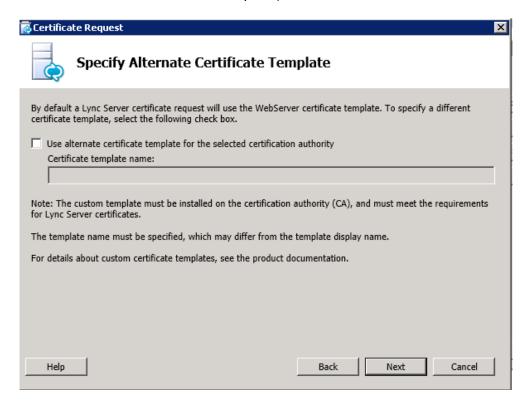


#### Next





Next (The server will use the Webserver template)

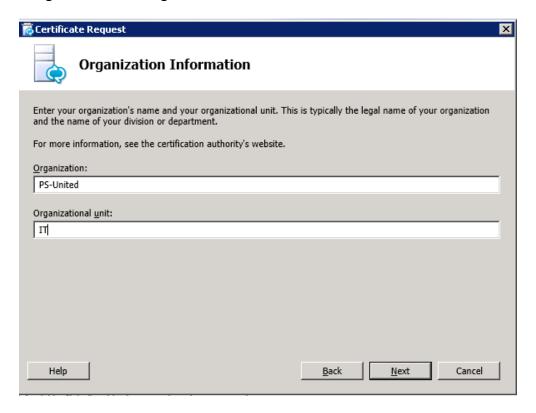


### Type Lync FE Cert as a friendly name

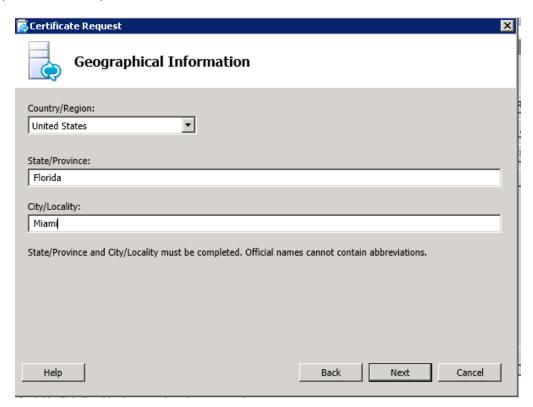




Fill out the Organization and Organization Unit fields

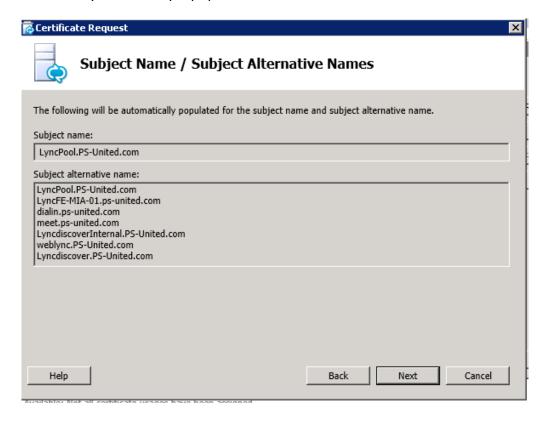


Country, State and City informations

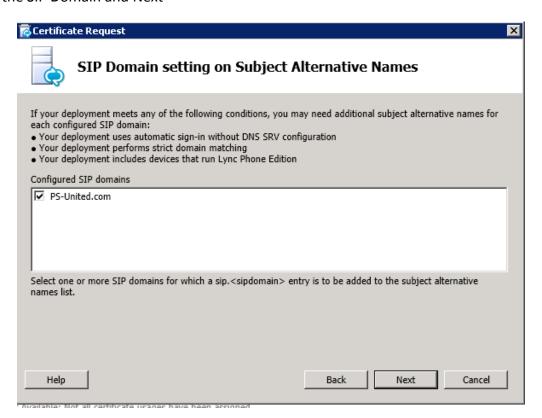




On the next screen you see the prepopulated SAN names

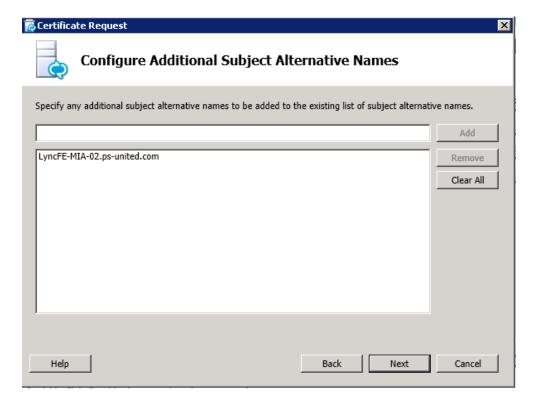


#### Select the SIP Domain and Next





Add LyncFE-MIA-02.ps-united.com as an additional SAN name to the certificate and Next

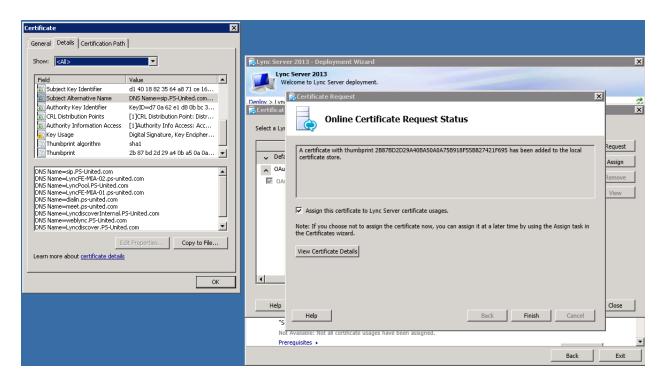


Check the summary and hit Next





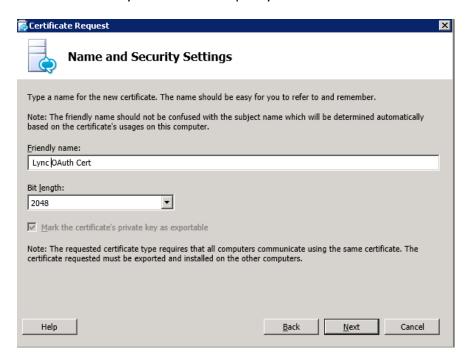
You can check the certificate details after it's created and select **Assign this certificate to Lync server Certificate** 



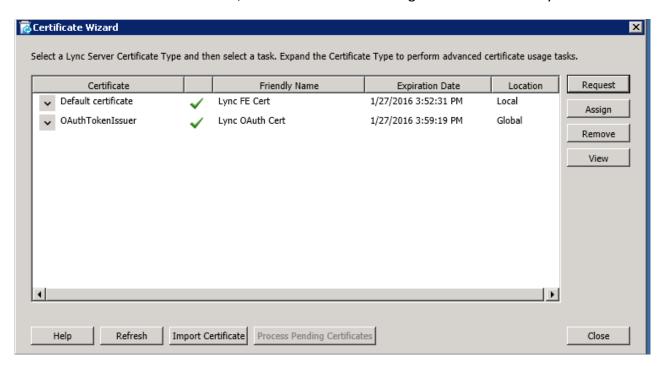


Start the OAuth certificate request and do the same steps as you did for the first certificate, find the differences below.

Give Lync OAuth Cert as friendly name for example Lync OAuth Cert



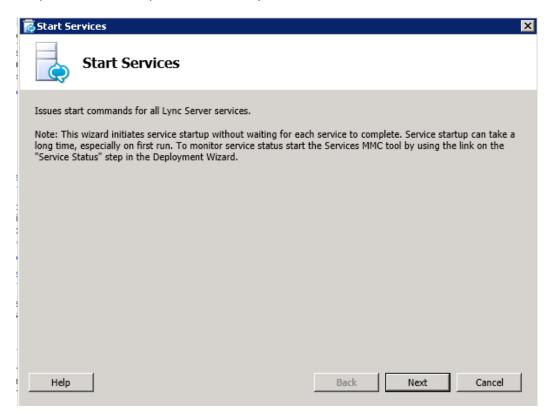
No need for additional SAN names, finish the wizard and assign the certificate to Lync



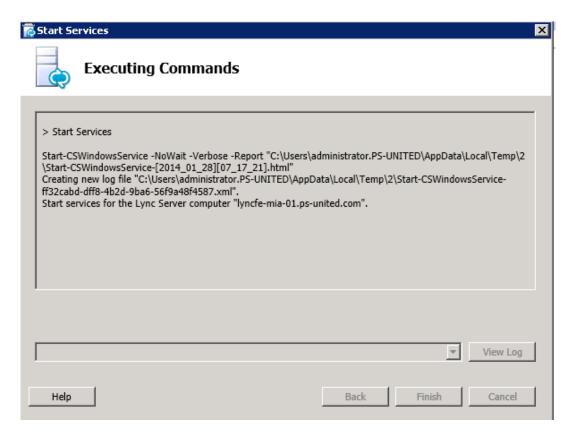


# Step 4 - Starting Lync Services

The last step is to start the Lync services on LyncFE-MIA-01.







For double check open Services MMC tool and check all Lync service. All service should be running except the Link-Layer Topology Discovery Mapper. Restart the server.



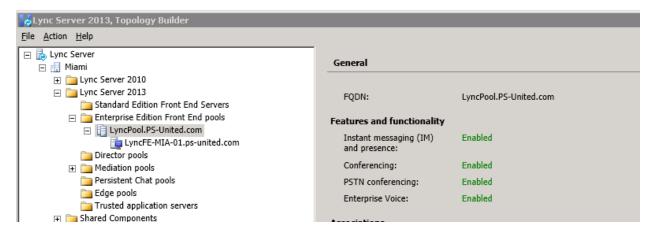


# 14. Adding Front End Server to the pool

When you add additional server to an existing pool you need to restart ALL front end server when you finished.

Logon to LyncFE-MIA-01 and start the Lync Server Topology Builder

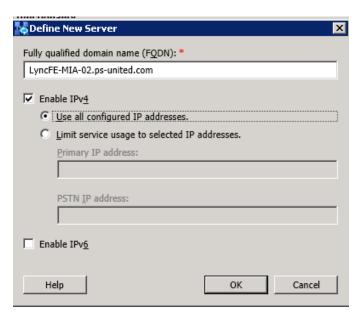
Navigate to the Lyncpool.ps-united.com pool under the Enterprise Edition Front End Pools folder



Right click on the pool and select New Server

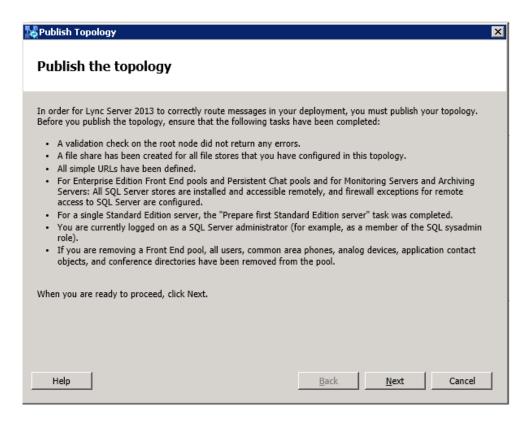
Acknowledge the warning

Type the server name LyncFE-MIA-02.ps-united.com and hit OK.

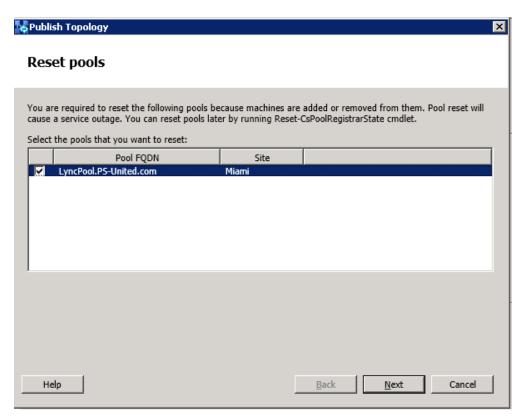


Go to the Lync Server folder, do a right click and select **Publish Topology** 



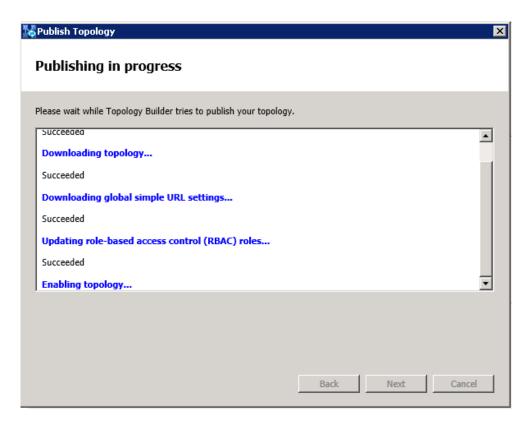


Publishing the topology will cause service outage, select Next

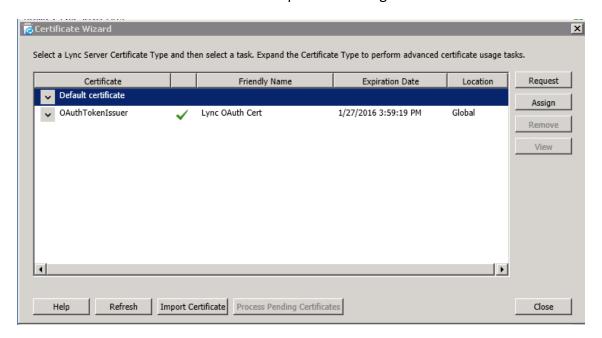


Topology publishing is in progress



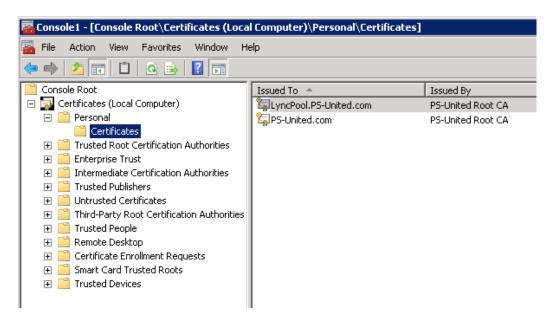


Now the second front end server is ready for installation. Install Lync Server and follow the steps from the Installing the first front end server section except the certificate part. When you start **Step 3 – Request, Install or Assign Certificates** you will see that the OAuth certificate is already installed because as I mentioned before it's replicated through the CMS.





To install the Default certificate first we need to export from the first front end server. Remember we put the second FE server name into it for this reason. Logon to **LyncFE-MIA-01** and open the Certificates MMC snap-in, we need the computer account certificate store. Once it's opened browse to the Certificate store under Personal where you see the default and OAuth certificate.

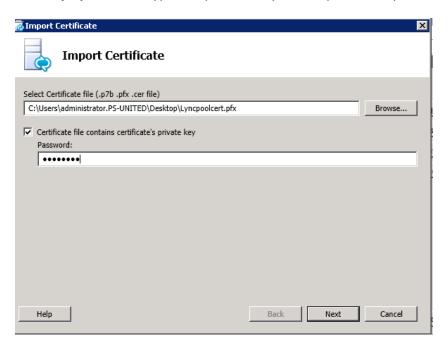


Right click on the **LyncPool.PS-united.com** one and select **Export** under **All task**. The certificate export wizard starts. At the second page select **Yes, export private key** option

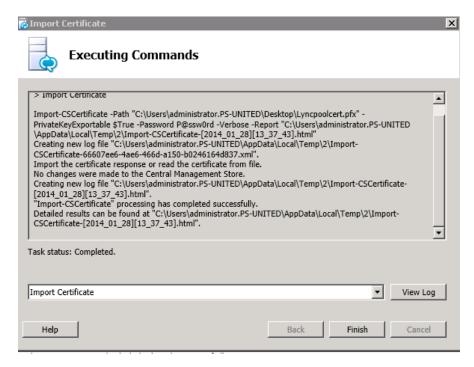




Finish the wizard then copy the .pfx file to the second FE server. Select the **Default certificate** in the **Certificate Wizard** window then select **Import Certificate** option. When the wizard starts Browse to the certificate you copied from the first FE server. Select **Certificate file contains certificate's private key option** and type the password you setup when exported the certificate.

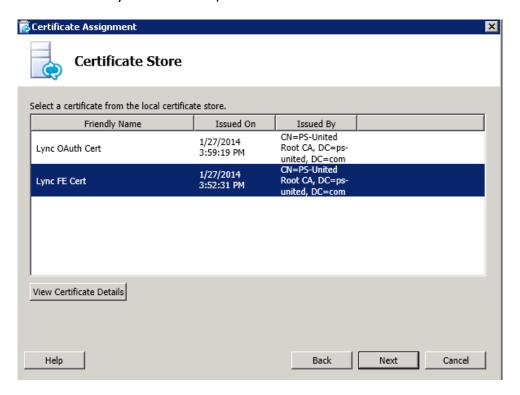


## Finish importing the certificate

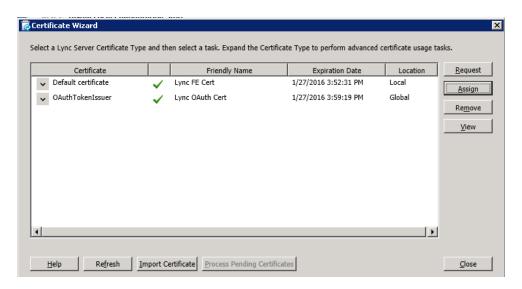




The last step is to assign the newly imported certificate to our server. Highlight the **Default certificate** and hit the **Assign** button. In **the Certificate Assignment** wizard select the **Lync FE Cert** (the other should be the Lync OAuth Cert).



After finishing the wizard both service will have the correct certificate and you can close the Certificate Wizard.

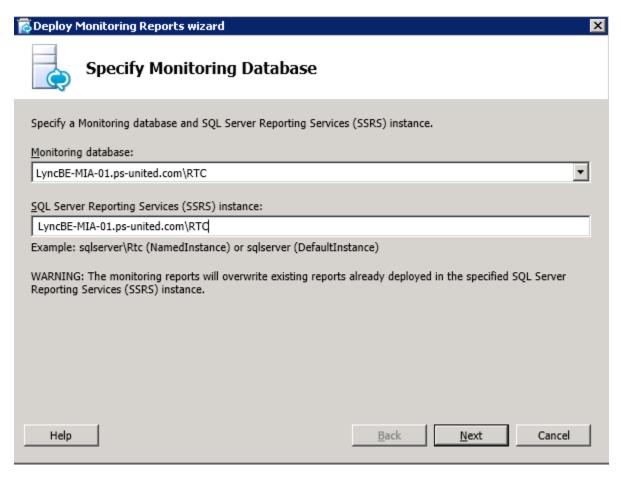


Start Lync services and make sure they are started.



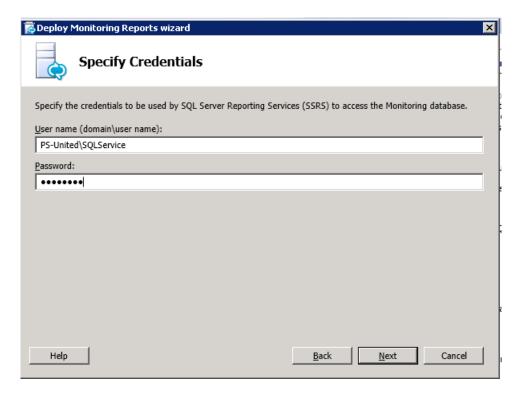
# 15. Reporting

The monitoring databases were configured under the Configuring the Back End server section so now we need to deploy the monitoring reports. Logon to LyncFE-MIA-01 and start the Lync Deployment Wizard then select Deploy Monitoring Reports option. On the first page of the wizard select the first front end LyncFE-MIA-01 server and make sure the SQL Server Reporting Services (SSRS) instance is LyncBE-MIA-01.ps-united.com\RTC

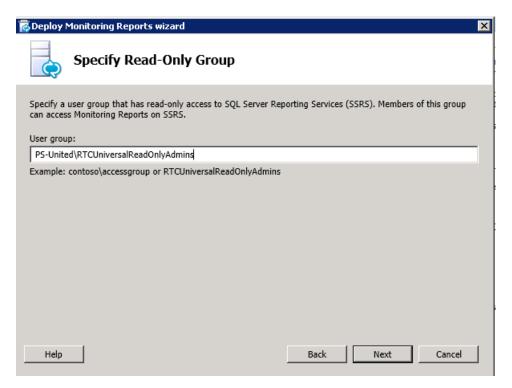




Type the SQLService service account details

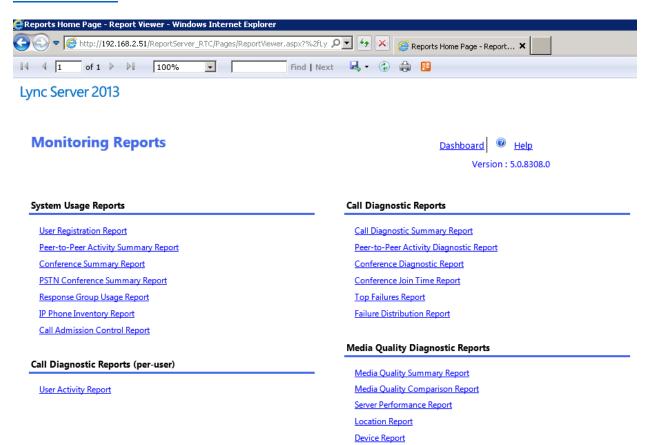


Enter the **PS-United\RTCUniversalReadOnlyAdmins** to the read only group and finish the wizard.





When the installation successfully finished you can reach the Monitoring Reports website via <a href="http://192.168.2.51/ReportServer">http://192.168.2.51/ReportServer</a> RTC?%2fLyncServerReports%2fReports+Home+Page&rs:Command=Render



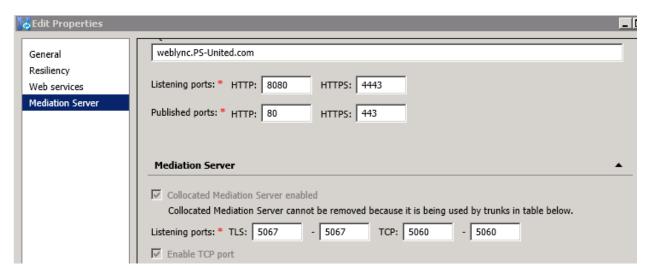


# 16. PBX Integration

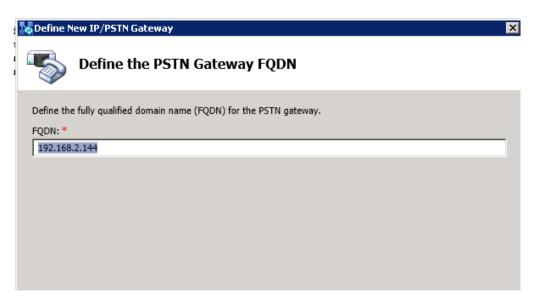
For PBX integration we need to know the IP of the PBX and the TCP port PBX using for communication to Lync. Also the PBX needto setup to accept and route call from Lync. PBX configuration is not part of this doc.

## Configure the Mediation Server

Open the Lync Toology builder on LyncFE-MIA-01 and go to the Lyncpool.ps-united.com pool under the Enterprise Edition Fron End Pools folder. Right click and select Edit Properties. Under the Mediation Server set the TCP listening port to 5060 (PBX will communicate with Lync on this port)

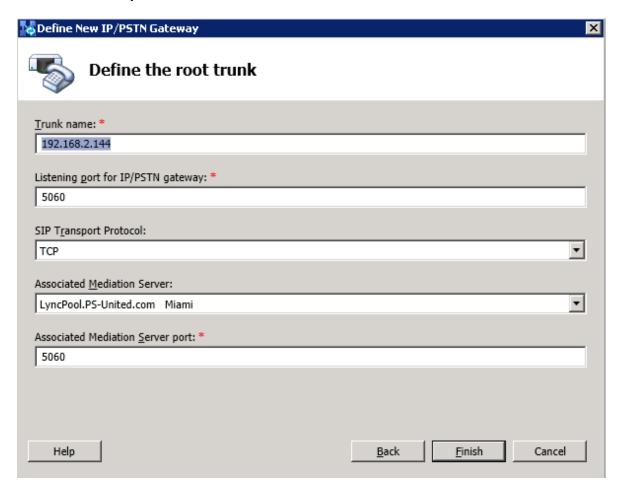


Go to the **Shared Components** nad right click on **PSTN Gateways** and select **New**. IP Addressof the PBX is 192.168.2.143





Leavethe Define IP Addressscreen on defualts. On the **Define root trunk** page set the **Listening port** to **5060** and change the **SIP Transport protocol** to **TCP**. **The Associated Mediation Server port** should be **5060** as well.

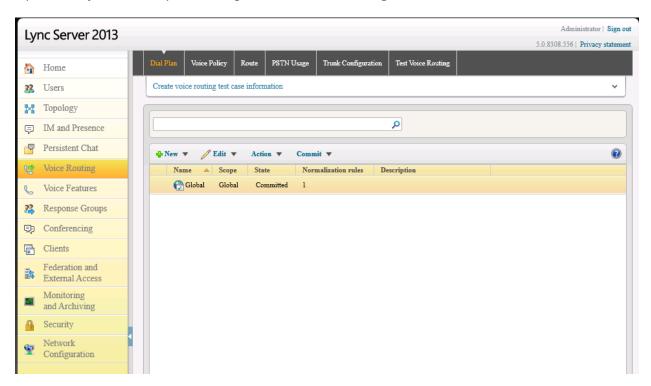


Publish the topology



# Configure voice routing

Open the Lync Control panel and go to the Voice Routing tab



We need to create a newdial plan to "translate" the phone numbers from the PBX to Lync and from Lync to PBX. In the PBX system the extensions are 1XXX meanwhile in Lync it's 2XXX.

Create a newdial plan, click **New** and select **User dial plan**. Give a name to the dial plan and create the following rules under the **Associated Normalization Rules** 

### Rule Lync:

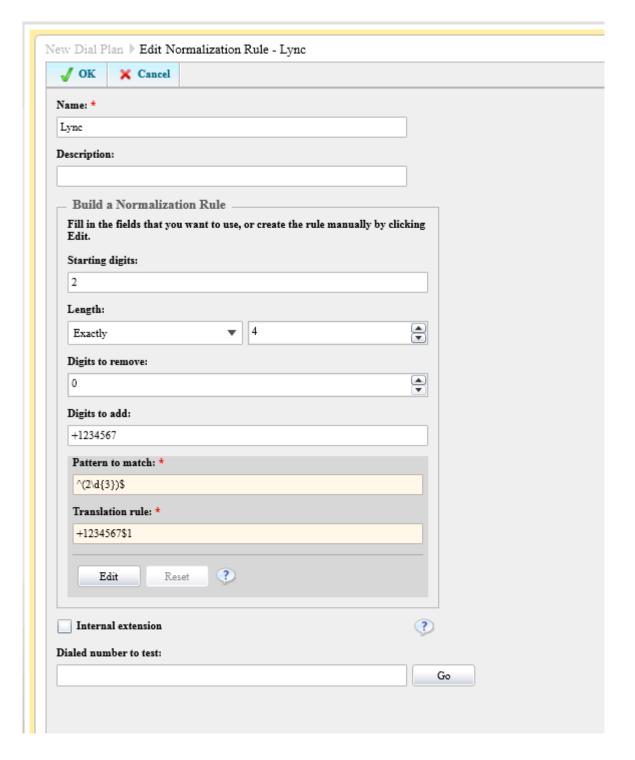
Starting digits: 2

• Length: Exactly 4

Digits to remove: 0

Digits to add: +1234567







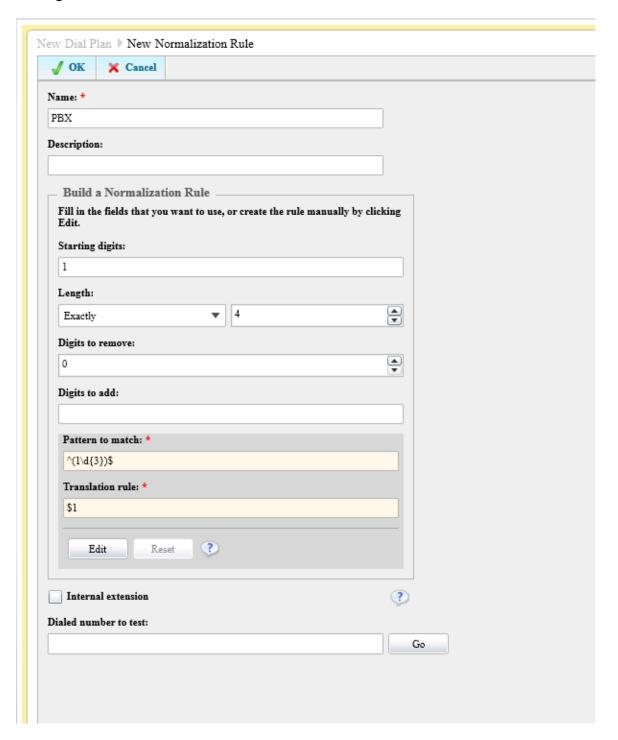
### Rule PBX

• Starter digits: 1

• Length: Exactly 4

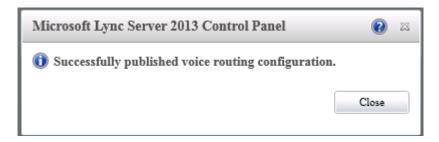
• Digits to remove: 0

• Digits to add: <null>



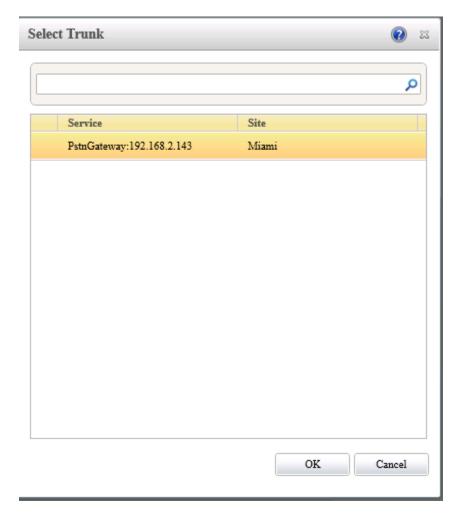


Go back to the **Dial Plan** main page and select **Commit all** 

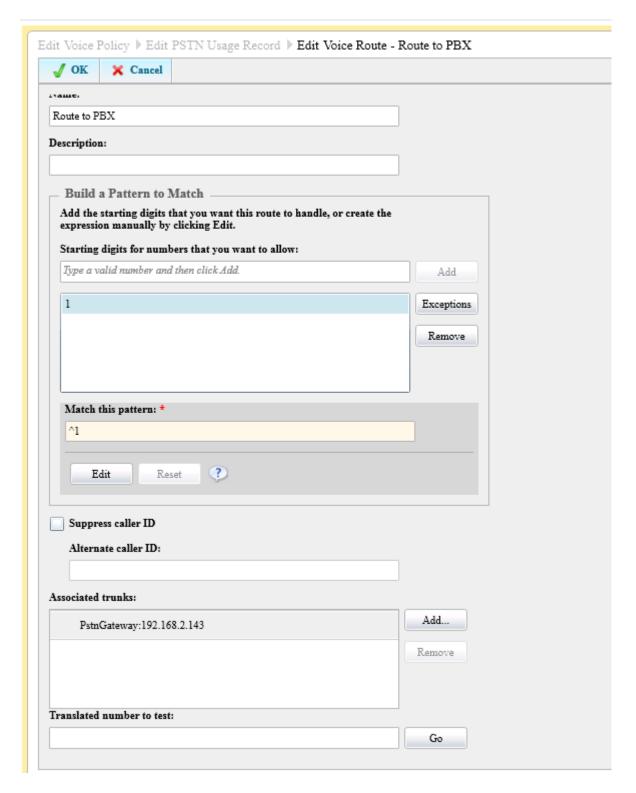


Go to the **Voice Policy** tab and open the **Global Voice Policy**. Select **New** under the **Associated PSTN Usages** 

Give name PBX PSTN and under the **Build Pattern to Match** type **1** to the **Starting digits for numbers that you want to allow**. Open **the Associated Trunks** option and add the **SIP Trunk** we created in the topology builder







Go back to the Voice Rouring main page and commit the changes.



# Enable users for voice

## Go to the Users tab in the Lync Control Panel

Setup a test user with the following details.

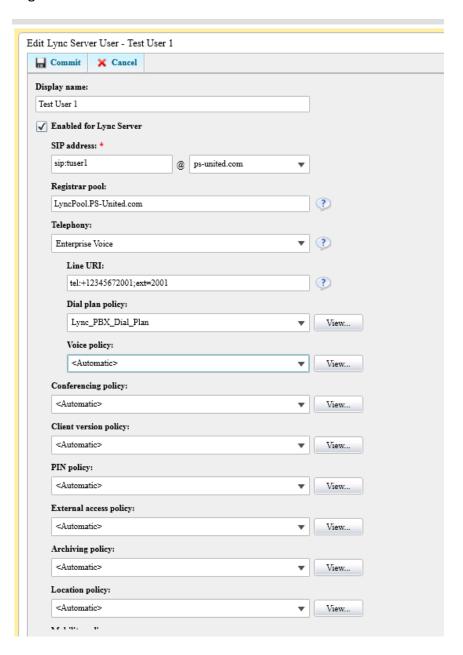
Registraar pool: lyncpool.ps-united.com

• Telephony: Enterprise Voice

• Line URI: <u>tel:+12345672001;ext=2001</u>

• Dial Plan policy: Lync\_PBX\_Dial\_Plan

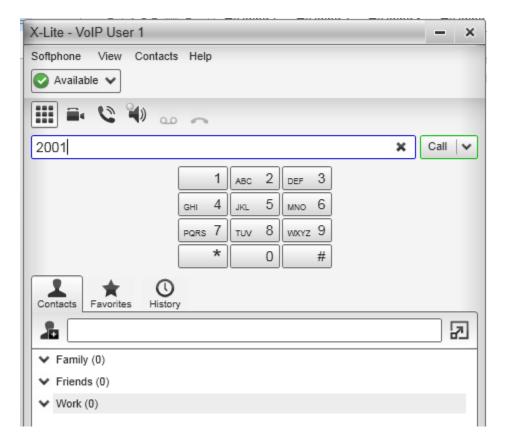
## Commit the changes





## **Test**

From the PBX system let's dial our Lync users. I use the X-lite softphone. Type the extension of our Lync user which is 2001 and hit dial

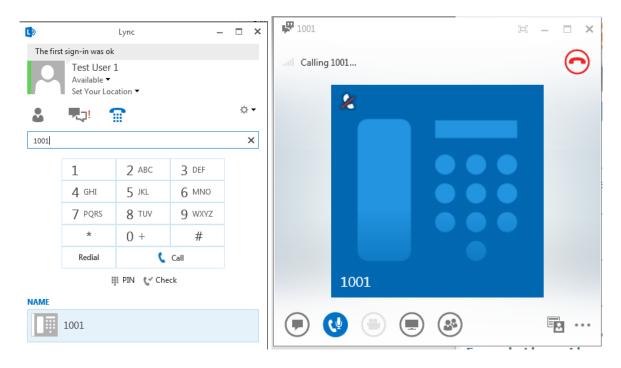


The call is coming in and we can "pickup" the phone



# Lync Server 2013

Now call back the PBX user from our Lync client. Dial 1001 (because the PBX in this case is configured only for extensions)



## And it's ringing on the softphone end



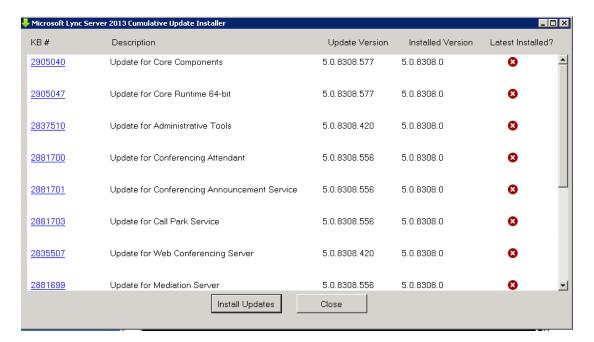


# 17. Updating Lync Server 2013

## **Updating FE Server**

Download the **LyncServerupdateInstaller.exe** from Microsoft Download Center and run it.It will give you a list of the components that has an update available. Before you start the updating processmake sure Lyncisready for the update.Run the **Get-CsPoolUpgradeReadinessState** cmdlet from the Lync ManagementShell.

The state is Ready you can start the update.





Select **Install Updates** and when it's finished restart the server. After the reboot and when all Lyncs ervices are running we update the database before we go ahead and update the second FE server.

## Updating the SQL databases

Start the Lync Management Shell and run this cmdlet to deletethe mirror database.

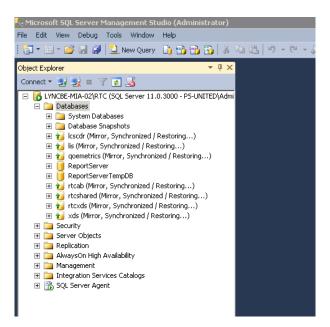
Uninstall-CsMirrorDatabase -DatabaseType Application - SqlServerFQDN LyncBE-MIA-01.ps-united.com -SqlInstanceName RTC - DropExistingDatabasesOnMirror -Verbose

```
PS C:\Users\administrator.PS-UNITED> Uninstall-CsMirrorDatabase -DatabaseType Application -SqlServerFQDN LyncBE-MIA-Ø1.ps-united.com -SqlInstanceName RIC -DropE xistingDatabasesOnMirror -Uerbose UERBOSE: Creating new log file
"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Uninstall-CsMirrorDatabase-edb68173-cd1d-4c3c-998d-e9409c8faddb.xml".

Uninstall Mirrors
Uninstall mirrors required by Lync Server role(s). Note that the cmdlet will try its best to drop the databases on the mirror server, but this is not guaranteed. After the cmdlet is finished, manually verify that the databases are dropped. If the databases are not dropped, drop the databases manually. Are you sure you want to proceed?

IVI Yes IAI Yes to All INI No ILI No to All ISI Suspend [?] Help (default is "Y"):A
UERBOSE: No changes were made to the Central Management Store.
UERBOSE: Creating new log file
"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Uninstall-CsMirrorDatabase-edb68173-cd1d-4c3c-998d-e9409c8faddb.html".
UERBOSE: Uninstall-CsMirrorDatabase" processing has completed successfully.
UERBOSE: Detailed results can be found at
"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Uninstall-CsMirrorDatabase-edb68173-cd1d-4c3c-998d-e9409c8faddb.html".
PS C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Uninstall-CsMirrorDatabase-edb68173-cd1d-4c3c-998d-e9409c8faddb.html".
PS C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Uninstall-CsMirrorDatabase-edb68173-cd1d-4c3c-998d-e9409c8faddb.html".
```

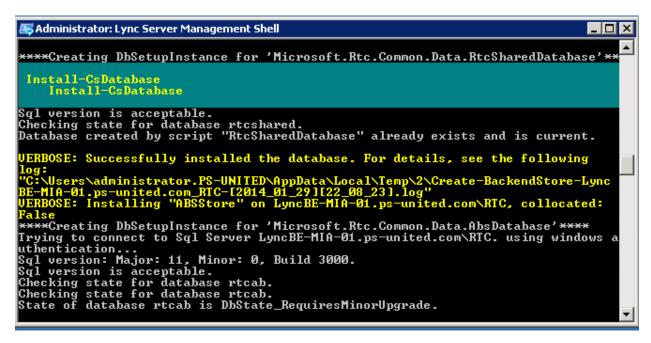
To verify open the **SQL Server Management Studio** on **LyncBE-MIA-02**. The **cpsdyn** databases hould be gone and all the others are in restoring state





### The next command is to update the database with the following cmdlet

Install-CsDatabase -ConfiguredDatabases -SqlServerFqdn LyncBE-MIA-01.ps-united.com -Verbose



#### Create the mirror database

Install-CsMirrorDatabase -DatabaseType Application SqlServerFQDN LyncBE-MIA-01.ps-united.com -SqlInstanceName RTC FileShare \\LyncWN-MIA-01\LyncSQLWitness -Verbose

```
WMI provider is running on all these servers.

The cmdlet will try to create folders for data and log files for all the mirror servers. Verify that the account running this cmdlet has permission to create these folders.

I'l Yes IAl Yes to All INI No ILl No to All ISl Suspend I?l Help (default is "Y"):a

VERBOSE: Mirroring was configured successfully for database "rgsconfig".

VERBOSE: Mirroring was configured successfully for database "rgsconfig".

VERBOSE: Mirroring was configured successfully for database "rgsdyn".

VERBOSE: Witness was configured successfully for database "rgsdyn".

VERBOSE: Witness was configured successfully for database "rgsdyn".

VERBOSE: Witness was configured successfully for database "rgsdyn".

VERBOSE: Successfully created SQL Server Agent jobs on

LyncBE-MIA-02.ps-united.com\RTC.

VERBOSE: Creating new log file

"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsMirrorDatabase -95cace05-b76c-4edc-922d-d52f3ffd6b34.html".

VERBOSE: Detailed results can be found at

"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsMirrorDatabase -95cace05-b76c-4edc-922d-d52f3ffd6b34.html".

VERBOSE: Obtailed results can be found at

"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsMirrorDatabase -95cace05-b76c-4edc-922d-d52f3ffd6b34.html".

PS C:\Users\administrator.PS-UNITED\
```



### Update the CMS

Install-CsDatabase -CentralManagementDatabase -SqlServerFqdn LyncBE-MIA-01.ps-united.com -SqlInstanceName RTC -Verbose

```
**C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsDatabase-bead6
3bb-603f-4114-a44b-486d5de218c9.xml".
UERBOSE: Install databases required by Lync Server role(s).
*****Creating DbSetupInstance for 'Microsoft.Rtc.Common.Data.XdsDatabase'***
Trying to connect to Sql Server LyncBE-MIA-01.ps-united.com\RIC. using windows a uthentication...
Sql version: Major: 11, Minor: 0, Build 3000.
Sql version is acceptable.
Checking state for database xds.
*****Creating DbSetupInstance for 'Microsoft.Rtc.Common.Data.LisDatabase'***
Trying to connect to Sql Server LyncBE-MIA-01.ps-united.com\RIC. using windows a uthentication...
Sql version: Major: 11, Minor: 0, Build 3000.
Sql version: Major: 11, Minor: 0, Build 3000.
Sql version is acceptable.
Checking state for database lis.
UERBOSE: All databases at the specified installation location are already up to date.
UERBOSE: Creating new log file
"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsDatabase-bead6
3bb-603f-4114-a44b-486d5de218c9.html".
UERBOSE: Utasild results can be found at
"C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsDatabase-bead6
3bb-603f-4114-a44b-486d5de218c9.html".
PS C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsDatabase-bead6
3bb-603f-4114-a44b-486d5de218c9.html".
PS C:\Users\administrator.PS-UNITED\AppData\Local\Temp\2\Install-CsDatabase-bead6
```

### Finally enable the topology

Enable-CsTopology



## **Useful Links**

- Lync 2013 planning tool <u>http://www.microsoft.com/en-us/download/details.aspx?id=36823</u>
- Lync 2013 Capacity Calculator
   <a href="http://www.microsoft.com/en-us/download/details.aspx?id=36828">http://www.microsoft.com/en-us/download/details.aspx?id=36828</a>
- Lync 2013 Resource Kit
   <a href="http://www.microsoft.com/en-us/download/details.aspx?id=36821">http://www.microsoft.com/en-us/download/details.aspx?id=36821</a>
- Lync 2013 Pre-Call diagnostic Tools
   <a href="http://www.microsoft.com/en-us/download/details.aspx?id=40733">http://www.microsoft.com/en-us/download/details.aspx?id=40733</a>
- Lync 2013 Debugging Tools
   http://www.microsoft.com/en-us/download/details.aspx?id=35453
- Lync 2013 Poster
   <a href="http://www.microsoft.com/en-us/download/details.aspx?id=39968">http://www.microsoft.com/en-us/download/details.aspx?id=39968</a>
- Lync updates and other download <u>http://technet.microsoft.com/en-us/lync/dn146015</u>

## References

- Microsoft TechNet
   http://technet.microsoft.com/en-us/library/gg398616.aspx
- TechNet blog http://blogs.technet.com
- TechNet Wiki http://social.technet.microsoft.com/wiki
- Mastering Microsoft Lync Server 2013 by Keith Hanna and Nathan Winters <a href="http://www.amazon.com/Mastering-Microsoft-Lync-Server-2013/dp/1118521323">http://www.amazon.com/Mastering-Microsoft-Lync-Server-2013/dp/1118521323</a>
- Getting Started with Microsoft Lync Server 2013 by Fabrizio Volpe http://www.packtpub.com/getting-started-with-microsoft-lync-server-2013/book